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1983–84 MISCELLANEOUS TAX BILLS, II

HEARING

BEFORE THE

SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT

OF THE

COMMITTEE ON FINANCE UNITED STATES SENATE

NINETY-EIGHTH CONGRESS

FIRST SESSION

ON

S. 654, S. 738, S. 1147, S. 1194, and S. 1195

MAY 27, 1983

Printed for the use of the Committee on Finance

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1983-84 MISCELLANEOUS TAX BILLS—II

MAY 27, 1983

U.S. SENATE,
SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT,
COMMITTEE ON FINANCE,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9:07 a.m. in room SD-215, Dirksen Senate Office Building, Hon. John C. Danforth presiding.

Present: Senators Danforth and Heinz.

[The press release announcing the hearing, background information on S. 738, S. 1147, S. 1194, and S. 1195, and the prepared statement of Senator Bensten follow:]

PRESS RELEASE No. 83-139

[For immediate release—May 9, 1983]

U.S. SENATE, COMMITTEE ON FINANCE, SUBCOMMITTEE ON TAXATION AND DEBT MANAGMENT

FINANCE SUBCOMMITTEE ON TAXATION AND DEBT MANAGMENT SETS HEARING ON FIVE MISCELLANEOUS TAX BILLS

Senator Bob Packwood, Chairman of the Subcommittee on Taxation and Debt Management, announced today that a hearing will be held on Friday, May 27, 1983, on five miscellaneous tax bills.

The hearing will begin at 9:00 a.m. in Room SD-215 of the Dirksen Senate Office Building.

The following legislative proposals will be considered:

S. 654.—Introduced by Senator Wallop and others. S. 654 would permit the deduction of all research and experimentation expenditures for research conducted in the United States against U.S. source income.

S. 738.—Introduced by Senator Danforth and others. S. 738 would make permanent the credit for increasing activity.

S. 1147.—Introduced by Senators Danforth and Tsongas. S. 1147 would exclude from income amounts arising out of the discharge of indebtedness on a principal residence.

S. 1194.—Introduced by Senator Danforth.

S. 1195.—Introduced by Senators Bentsen and Chafee.

S. 1194 and S. 1195 would increase the charitable contribution deduction for certain scientific equipment, expand the tax credit for research activities and extend the exclusion from income for certain amounts received by students.

STATEMENT OF SENATOR LLOYD BENSTEN

Mr. Chairman: The R&D bills being discussed today have three major components:

Expansion of the R&D tax credit to cover faculty salaries and graduate student aid;

Expansion of the charitable deduction provision to include high-tech equipment donated for teaching purposes to colleges and VocEd schools;

Expansion of the charitable deduction provision to include computers donated to elementary and secondary schools.

The first and second components of both S. 1194 and S. 1195 are provisions which were first introduced by me last Spring in the 97th Congress. And the third provision was sponsored last year by Senator Danforth.

All three provisions reflect the best thinking of our universities, VocEd institutions, and the electronics industry regarding the most effective way to rebuild our Nation's technical base and boost basic research.

That base is in serious disrepair and jeopardizes our ability to maintain the technological lead we need to protect markets here and abroad and the jobs which go with them. We live in an interrelated world where resources and capital are very mobile internationally. The best guarantee of market expansion and expanding job opportunities here at home comes from maintaining a technology edge over our competitors. Yet, there are signs that our traditional edge is being blunted—perhaps best exemplified by the Japanese capture of 70 percent of the 64-K RAM chip market wouldwide.

The reasons are many:

Outdated and inadequate teaching equipment in our colleges and VocEd schools;

Serious faculty shortages—10 percent or more in engineering schools, for example—aggravated by sagging graduate student enrollments in engineering and the sciences, which has enabled Japan to graduate 25 percent more electrical engineers than we do with only half our population;

The need for greater computer literacy in our school curriculums.

Beneath these reasons is a fundamental need to boost the level of civilian research performed here, expecially basic R&D.

According to a new CRS analysis, we were greatly outspending the next four largest industrial nations in R&D back in the 1960's. In fact, Japan, Germany, France, and England together were spending only 10 to 12 percent of our own spending on civilian R&D in 1964. But they increased their commitment to R&D while we stood still. The result was that they caught us in 1975 and are now spending about 20 percent more than we are on civilian R&D. In fact, both Japan and Germany are devoting a considerably higher proportion of their GNP on civilian R&D than we are.

We see the same picture when we look at trends in basic research, too—the type of risky research which may never pay off or pays off down the road in spectacular fashion. As a share of GNP, our commitment to basic R&D has fallen by more than 20 percent since 1970. Both Japan and West Germany devote more of their GNP to basic research than we do now—meaning we face an even harder task in the years ahead maintaining our technological edge.

There are many things we must do to restore basic research—including accommodating establishment of basic R&D joint ventures like the Microelectronics and Computer Technology Corporation settling in Austin. But one critical step is to enhance the after-tax attractions of basic R&D by improving the incentives for firms to collaborate with universities on such research. That aspect of both S. 1194 and S. 1195 may be the most important single feature of these bills—or of any bill we consider this year.

DESCRIPTION OF TAX BILLS S. 738, S. 1147, S. 1194, AND S. 1195

SCHEDULED FOR A HEARING BEFORE THE SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT OF THE COMMITTEE ON FINANCE ON MAY 27 1983

(Prepared by the Staff of the Joint Committee on Taxation)

INTRODUCTION

The bills described in this pamphlet have been scheduled for a public hearing on May 27, 1983, by the Senate Finance Subcommittee on Taxation and Debt Management.

There are five bills scheduled for the hearing. Four of the bills (S. [redacted], S. 738, S. 1194, and S. 1195) generally would extend or expand provisions of present law relating to the tax treatment of expenditures for research and development. The fifth bill (S. 1147) relates to the tax treatment of income from discharge of indebtedness on a personal residence.

The first part of the pamphlet is a summary of the bills. This is followed by a more detailed description of the bills, including present law, explanation of provisions, and effective dates.

SUMMARY

2. S. 738—Senators Danforth, Bentsen, Chafee, Glenn, Grassley, Symms, Boren, Tsongas, Durenberger, Wilson, and Cohen

Make Permanent the Credit for Increased Research Expenditures

An income tax credit is allowed for certain qualified research expenditures incurred in carrying on a trade or business (Code sec. 44F, enacted in ERTA). The credit applies only to the extent that the taxpayer's qualified research expenditures for the taxable year exceed the average amount of yearly qualified research expenditures in the specified base period (generally, the preceding three taxable years). The rate of the credit is 25 percent of the incremental research expenditure amount.

For purposes of the section 44F credit, the definition of research is the same as that used for purposes of the special deduction rules under section 174, but subject to certain exclusions. A taxpayer's research expenditures eligible for the section 44F incremental credit consist of (1) "in-house" expenditures by the taxpayer for research wages and supplies used in research, plus certain amounts paid for research use of laboratory equipment, computers, or other personal property; (2) 65 percent of amounts paid by the taxpayer for contract research conducted on the taxpayer's behalf; and (3) if the taxpayer is a corporation, 65 percent of the taxpayer's expenditures (including grants or contributions) pursuant to a written research agreement for basic research to be performed by universities or certain scientific research organizations.

Under present law, the section 44F credit will not apply to research expenditures after December 31, 1985. The bill would make the credit permanent.

3. S. 1147—Senators Danforth, Tsongas, Symms, and Thurmond

"Mortgage Debt Forgiveness Tax Act of 1983"

Under present law, the amount of any discharged indebtedness generally is includible in income in the year of the discharge (Code sec. 61(a)(12)). However, if the debt was incurred in connection with property used in a trade or business (or if the debt is discharged when the taxpayer is in bankruptcy or insolvent), certain of the taxpayer's tax attributes may be reduced in lieu of recognizing income (secs. 108, 1017). The Internal Revenue Service has ruled that when a financially solvent taxpayer prepays a mortgage on his or her personal residence for an amount less than the remaining principal balance of the mortgage, the taxpayer realizes income equal to the amount of the discount.

The bill would exclude from gross income the amount of discharged mortgage indebtedness on an individual's principal residence. The taxpayer's basis in the residence would be reduced by the excluded amount. The bill also provides that if the taxpayer subsequently disposes of the residence in a taxable sale or exchange, any gain recognized would be recaptured as ordinary income to the extent of the excluded amount, i.e., the amount of discharged mortgage indebtedness.

The bill would apply retroactively to taxable years beginning after 1953. Claims for retroactive credit or refund of overpayments arising by reason of the bill could be filed within a one-year period beginning on the date of enactment.

4. S. 1194—Senators Danforth, Symms, Chafee, Burdick, Pell, Wilson, Inouye, and Cohen

"Technology Education Assistance and Development Act of 1983"

and

5. S. 1195—Senators Bentsen and Chafee

"High Technology Research and Educational Development Act of 1983"

a. Increased Deduction for Transfers of Scientific, Technical, or Computer Equipment for Certain Research or Educational Purposes

Present law

In general, the amount of charitable deduction otherwise allowable for donated property must be reduced by the amount of any ordinary gain which the taxpayer would have realized had the property been sold for its fair market value at the date of the contribution (Code sec. 170(e)). For example, a manufacturer which makes a charitable contribution of its inventory generally may deduct only its basis in the property.

However, under a special rule enacted in ERTA, corporations are allowed an augmented charitable deduction for donations of newly manufactured scientific equipment to a college or university for research use in the physical or biological sciences (sec. 170(e)(4)). This increased deduction is generally for the sum of (1) the corporation's basis in the donated property and (2) one-half of the unrealized appreciation (i.e., one-half of the difference between the property's fair market value determined at the time of the contribution and the donor's basis in the property). However, in no event is the deduction under the special rule allowed for an amount which exceeds twice the basis of the property.

S. 1194 (section 2)

In place of the special charitable deduction rule enacted in ERTA, the bill would enact a new deduction provision, generally of broader scope, outside the charitable deduction rules. The provision would be effective for taxable years beginning after the date of enactment.

Under the new provision, corporations would receive deductions for amounts in excess of basis for transfers, without consideration, of scientific or technical equipment (including property used in the transferor's business and computer software) to colleges or universities, for use in either research or education in certain sciences or vocational education fields, and for transfers, without consideration, of newly manufactured computer equipment (including software) to secondary or elementary schools, museums, libraries, or correctional institutions, for use in education. In addition, augmented deductions would be allowed for the costs of performing certain maintenance and repair services in connection with such property transfers. In the case of scientific equipment transferred to colleges or universities, only an item having a retail value exceeding $500 ($250 for computer software) generally would be eligible for the new augmented deduction.

The augmented deduction under S. 1194 generally would not be allowed to the extent that, determined on a product-by-product basis, the number of transferred items exceeds 20 percent of the number of such items sold by the taxpayer during the year. Also, while the transfers would not be required to qualify as charitable contributions in order for the enhanced deduction to apply, the taxpayer's aggregate deduction in one year for both charitable contributions and transfers under the new provision would be limited to 10 percent of taxable income (computed with certain modifications), with a five-year carryforward of any excess.

In the case of computer equipment transfers to secondary schools, etc., the augmented deduction would apply only during the five-year period beginning on enactment of the bill. Also, S. 1194 would require that the transferor of such computer equipment generally must provide, at no cost to the recipient school, etc., sufficient orientation to make at least one employee of the recipient per data processor proficient in use of the transferred property in the direct education of students.

S. 1195 (section 2)

In place of the special charitable deduction rule enacted in ERTA, the bill would enact a new deduction provision, generally of broader scope, outside the charitable deduction rules. The provision would be effective for taxable years beginning after the date of enactment.

Under the new provision, corporations would receive deductions for amounts in excess of basis for transfers, without consideration, of scientific or technical equipment (including property used in the transferor's business and computer software) to colleges, universities, or vocational education schools or programs, for use in either research or education in certain scientific or technological fields, and for transfers, without consideration, of newly manufactured computer equipment (including software) to secondary or elementary schools, for use in education. In addition, augmented deductions would be allowed for the costs of performing certain maintenance and repair services in connection with such property transfers. With certain exceptions, only an item having a value exceeding $250 would be eligible for the new augmented deduction.

The augmented deduction under S. 1195 generally would not be allowed to the extent that, determined on a product-by-product basis, the number of transferred items exceeds 20 percent of the number of such items sold by the taxpayer during the year. Also, while the transfers would not be required to qualify as charitable contributions in order for the augmented deduction to apply, the taxpayer's aggregate deduction in one year for both charitable contributions and transfers under the new provision would be limited to 10 percent of taxable income (computed with certain modifications), with a five-year carryforward of any excess.

In the case of computer equipment transfers to schools, the augmented deduction would apply only during the five-year period beginning on enactment of the bill. Also, S. 1195 would require that the transferor of such computer equipment must provide, at no cost to the school or its teachers, sufficient orientation to make at least one teacher per data processor proficient in use of the transferred property in the direct education of students.

b. Expansion of Section 44F Credit

Present law

An income tax credit is allowed for certain qualified research expenditures incurred in carrying on a trade or business (Code sec. 44F, enacted in ERTA). The credit applies only to the extent that the taxpayer's qualified research expenditures for the taxable year exceed the average amount of yearly qualified research expenditures in the specified base period (generally, the preceding three taxable years). The rate of the credit is 25 percent of the incremental research expenditure amount.

Under present law, research expenditures eligible for the section 44F incremental credit consist of (1) "in-house" expenditures by the taxpayer for research wages and supplies used in research, plus certain amounts paid for research use of laboratory equipment, computers, or other personal property; (2) 65 percent of amounts paid by the taxpayer for contract research conducted on the taxpayer's behalf; and (3) if the taxpayer is a corporation, 65 percent of the taxpayer's expenditures (including grants or contributions) pursuant to a written research agreement for basic research to be performed by universities or certain scientific research organizations.

S. 1194 (section 3)

Expansion of credit.—Under the bill, the category of corporate expenditures eligible for a 25-percent credit under Code section 44F would be expanded also to include 65 percent of amounts paid to a college or university, pursuant to written agreement, for scientific education uses. The latter term would mean the education of students or faculty in mathematics, engineering, computer science, and the physical and biological/biomedical sciences.

To qualify, the amounts would have to be used for payment of wages to faculty employees who are directly engaged in providing scientific education, or for funding scholarships or loans for students at the institution who are engaged in postgraduate study in certain scientific fields. In addition, amounts to be used for wages would have to be paid to the college or university pursuant to a written agreement which obligates the taxpayer to render a like amount to the recipient for at least three consecutive years.

Under a special limitation in the bill, corporate expenditures for scientific education would be eligible for the section 44F credit only to the extent exceeding the average of all charitable contributions made by the taxpayer to colleges and universities during the three preceding taxable years, excluding such contributions which were designated by the taxpayer for scientific education use.

Base period determinations.—Under S. 1194, corporate expenditures for either basic research or scientific education which were included in the section 44F credit computation in a prior taxable year would be excluded, in calculating incremental expenditures for the current taxable year, from the amount of base period expenditures for that prior year. Thus, as long as the taxpayer did not decrease the amount of its other expenditures qualifying under section 44F, the 25-percent credit would apply to 65 percent of all the taxpayer's qualifying basic research or qualifying scientific education expenditures in the current year (determined after application of the special limitation described above).

Effective date.—The amendments to the section 44F credit made by the bill would apply to taxable years beginning after the date of enactment.

S. 1195 (section 3)

Expansion of credit.—Under the bill, the category of corporate expenditures eligible for a 25 percent credit under Code section 44F would be expanded also to include 65 percent of amounts paid to a college, university, or area vocational education school, pursuant to written agreement, for scientific education uses. The latter term would mean the education of students or faculty in engineering or engineering technologies, the physical, biological, and computer sciences or technologies, mathematics, and electronic and automated medical, industrial, and agricultural equipment and instrumentation orientation.

To qualify, the amounts would have to be used for payment of wages to faculty employees who are directly engaged in providing scientific education, or for funding scholarships or loans for students who are engaged in postgraduate study in certain scientific fields. In addition, amounts to be used for wages would have to be paid to the educational institution pursuant to a written agreement which obligates the taxpayer to render a like amount to the recipient for at least three consecutive years.

Based period computation.—Under S. 1195, corporate expenditures for either basic research or scientific education which were included in the section 44F credit computation in a prior taxable year would be excluded, in calculating incremental expenditures for the current taxable year, from the amount of base period expenditures for that prior year. Thus, as long as the taxpayer did not decrease the amount of its other expenditures qualifying under section 44F, the 25 percent credit would apply to 65 percent of all the taxpayer's qualifying basic research and scientific education expenditures in the current year.

Effective date.—The amendments to the section 44F credit made by the bill would apply to taxable years beginning after the date of enactment.

c. Tax Treatment of Payments and Loan Forgiveness Received by Certain Graduate Science Students

Present law

Scholarship exclusion.—Subject to several limitations, gross income does not include amounts received as a scholarship at an educational institution or as a fellowship grant (Code sec. 117).

In general, scholarships or fellowship grants are not excludable from gross income if they constitute compensation for past, present, or future employment services or for services subject to the direction or supervision of the grantor, or if the funded studies or research are primarily for the benefit of the grantor (Treas. Regs. sec. 1.117-4(c)). However, amounts received under Federal programs that are used for qualified tuition and related expenses are not disqualified from the exclusion merely because the recipient agrees to perform future services as a Federal employee or in a health manpower shortage area (sec. 117(c)).

Forgiveness of debt.—As a general rule, income is realized when indebtedness is forgiven or cancelled (sec. 61(a)(12)).

S. 1194 (section 4) and S. 1195 (section 4)

The bills would provide a new Code section under which gross income would not include amounts received by graduate science students as a scholarship, fellowship grant, or qualified student loan forgiveness, notwithstanding that the recipient is required to perform future teaching services as a condition of receiving such amounts.

The new provision would apply to students who are engaged in postgraduate study as degree candidates in mathematics, engineering, the physical or biological sciences, or certain computer fields at qualified educational organizations. To be eligible for the exclusion where future teaching services are required, the scholarship, grant, or loan forgiveness amount must be used for qualified tuition and related expenses, including tuition and fees, books, supplies, and equipment required for courses.

The scholarship and loan forgiveness provisions of the bills would apply to taxable years beginning after the date of enactment.

II. DESCRIPTION OF BILLS

1. S. 654—Senators Wallop, Armstrong, Symms, Boren, Durenberger, Danforth, Roth, Glenn, Heinz, Packwood, Chafee, Bentsen, and Baucus

Rules for Allocating Research Expenditures to U.S.-Source Income

Treasury Regulations

In determining foreign-source taxable income for purposes of computing the foreign tax credit limitation (sec. 904), and for other tax purposes, Code sections 861-863 require taxpayers to allocate or apportion expenses between foreign-source income and U.S.-source income. Treasury Regulation section 1.861-8 sets forth rules for allocating and apportioning these expenses.

Under this regulation, research and development expenditures ("research expenditures") are allocated to income based on a broad classification of 32 product groups enumerated in the Standard Industrial Classification ("SIC") Manual. Research expenditures are not allocable solely to the income generated by the particular product which benefited from the research activity. Instead, these expenditures are allocable to all the income within the SIC product group in which the product is classified. Accordingly, once a research expenditure is identified with a SIC product group, it is apportioned to foreign sources based on the ratio of total foreign source sales receipts or income within the SIC product group to the total worldwide sales receipts or income within the SIC product group.

Treasury Regulation section 1.861-8 provides certain "safe harbors" when more than 50 percent of the research expenditures are incurred either within or without the United States. For years beginning in 1979, the regulation allows a taxpayer to apportion 30 percent of the research expenditures to the geographic source in which more than 50 percent of such expenditures were incurred.

The regulation also provides that if the taxpayer's results of operations justify a geographic apportionment of research expenditures to the country in which the research is performed that would be higher than the 30 percent allowed under this safe harbor rule, then the taxpayer may make such higher allocation. The remaining portion of the research expenditures is then apportioned based upon the SIC formula.

Explanation of 1981 Provision

In the Economic Recovery Tax Act of 1981 (ERTA), the Congress directed the Treasury Department to study the impact of the research expenditure allocation provisions of Treasury Regulation section 1.861-8 on research activities conducted in the United States and on the availability of the foreign tax credit. The study, with recommendations to the Congress, is to be submitted by the Secretary of the Treasury to the Senate Committee on Finance and the House Committee on Ways and Means.

Also, for a taxpayer's first two taxable years beginning after the date of enactment of ERTA (August 13, 1981), all research and experimental expenditures (within the meaning of Code sec. 174) which are paid or incurred in those taxable years (and only in those taxable years) for research activities conducted in the United States are to be allocated or apportioned to sources within the United States for all purposes under the Code (sec. 223 of ERTA).

One reason for enacting this two-year suspension was that some foreign countries do not allow deductions under their tax laws for expenses of research activities conducted in the United States. It was argued that this disallowance results in unduly high foreign taxes and that, absent changes in the foreign tax credit limitation, U.S. taxpayers would lose foreign tax credits. Because those taxpayers could take their deductions if the research occurs in the foreign country, it was argued that there was incentive for taxpayers to shift their research expenditures to those foreign countries whose laws disallow tax deductions for research activities conducted in the United States but allow tax deductions for research expenditures incurred locally.

Accordingly, the Congress concluded that the Treasury should study the impact of the allocation of research expenses under Regulations section 1.861-8 on U.S.-based research activities. While that study is being conducted by the Treasury and considered by the Congress, the Congress concluded that expenses should be charged to the cost of generating U.S.-source income, whether or not such research directly or indirectly is a cost of producing foreign-source income.

Explanation of the Bill

General rule

S. 654 would provide that for purposes of Code sections 861(b) and 862(b), all amounts allowable as a deduction for research and experimental expenditures (within the meaning of sec. 174) attributable to activities conducted in the United States are to be allocated to sources within the United States.

Effective date

The amendment made by the bill would apply retroactively to taxable years beginning after 1980.

2. S. 738—Senators Danforth, Bentsen, Chafee, Glenn, Grassley, Symms, Boren, Tsongas, Durenberger, Wilson, and Cohen

Make Permanent the Credit for Increased Research Expenditures

Present Law

Current deduction for certain research expenditures

General rule.—As a general rule, business expenditures to develop or create an asset which has a useful life that extends beyond the taxable year, such as expenditures to develop a new product or improve a production process, must be capitalized. However, Code section 174 permits a taxpayer to elect to deduct currently the amount of "research or experimental expenditures" incurred in connection with the taxpayer's trade or business. For example, a taxpayer may elect to expense the costs of wages paid for services performed in qualifying research activities, and of supplies and materials used in such activities, even though these research costs otherwise would have to be capitalized.

The section 174 election does not apply to expenditures for the acquisition or improvement of depreciable property, or land, to be used in connection with research. Thus, for example, the cost of a research building or of equipment used for research cannot be expensed under 174. However, depreciation (cost recovery) allowances with respect to depreciable property used for research may be expensed under the election. Under ACRS, machinery and equipment used in connection with research and experimentation are classified as three-year recovery property and are eligible for a six-percent regular investment tax credit.

Qualifying expenditures.—The Code does not specifically define "research or experimental expenditures" eligible for the section 174 deduction election (except to exclude certain costs). Treasury regulations (sec. 1.174-2(a)) define this term to mean "research and development costs in the experimental or laboratory sense." This includes generally "all such costs incident to the development of an experimental or pilot model, a plant process, a product, a formula, an invention, or similar property", and also the costs of obtaining a patent on such property.

The present regulations provide that qualifying research expenditures do not include expenditures "such as those for the ordinary testing or inspection of materials or products for quality control or those for efficiency surveys, management studies, consumer surveys, advertising, or promotions." Also, the section 174 election cannot be applied to costs of acquiring another person's patent, model, production, or process or to research expenditures incurred in connection with literary, historical, or similar projects (Reg. sec. 1.174-2(a)).

Credit for increasing certain research expenditures

Overview

General rule.—An income tax credit is allowed for certain qualified research expenditures paid or incurred by a taxpayer during the taxable year in carrying on a trade or business of the taxpayer (Code sec. 44F, enacted in the Economic Recovery Tax Act of 1981). The credit applies only to the extent that the taxpayer's qualified research expenditures for the taxable year exceed the average amount of the taxpayer's yearly qualified research expenditures in the specified base period (generally, the preceding three taxable years). The rate of the credit is 25 percent of the incremental research expenditure amount.

Under present law, the section 44F credit applies to qualified research expenditures paid or incurred after June 30, 1981 and before January 1, 1986.

Qualifying expenditures.—For purposes of the section 44F credit, the definition of research is the same as that used for purposes of the special deduction rules under section 174, but subject to certain exclusions. A taxpayer's research expenditures eligible for the section 44F incremental credit consist of (1) "in-house" expenditures by the taxpayer for research wages and supplies used in research, plus certain amounts paid for research use of laboratory equipment, computers, or other personal property; (2) 65 percent of amounts paid by the taxpayer for contract research conducted on the taxpayer's behalf; and (3) if the taxpayer is a corporation, 65 percent of the taxpayer's expenditures (including grants or contributions) pursuant to a written research agreement for basic research to be performed by universities or certain scientific research organizations.

Relation to deduction.—The credit is available for incremental qualified research expenditures for the taxable year whether or not the taxpayer has elected under section 174 to expense research expenditures. The amount of any section 174 deduction to which the taxpayer is entitled is not reduced by the amount of any credit allowed for qualified research expenditures.

Explanation of incremental credit

Definition of qualifying research

General rule.—Subject to certain exclusions, the credit provision adopts the definition of research as used in section 174. That is, the term "qualified research" for purposes of section 44F has the same meaning, subject to the specified exclusions, as has the term "research or experimental" under section 174.[1]

Computer software development costs.—The Internal Revenue Service has taken the position that certain costs of developing computer software may be treated in a manner similar to costs incurred in product development which are subject to the section 174 deduction election (Rev. Proc. 69-21, 1969-2 C.B. 303). This treatment applies to costs incurred in developing new or significantly improved programs or routines that cause computers to perform desired tasks (as distinguished from other software costs where the operational feasibility of the program or routine is not seriously in doubt).

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[1] While the definition of research generally is the same for purposes both of section 174 deduction election and the credit, particular research expenditures which qualify for the section 174 deduction election may be ineligible for the credit, e.g., because the expenditures fail to satisfy the section 162 trade or business requirement for the credit, because the expenditures do not fall within the categories of research expenditures (such as direct research wages) which qualify for the credit, or because the expenditures fall within one of the exclusions from the credit.

For purposes of the section 44F credit, otherwise qualifying types of expenditures (for example, direct wage expenditures) which are part of the costs of otherwise qualifying research for the development of new or significantly improved computer software are intended to be eligible for the credit to the extent that such expenditures (1) are treated as similar to costs, incurred in product research, which are deductible as research expenditures under section 174; (2) satisfy the requirements of new section 44F which apply to research expenditures;[2] and (3) do not fall within any of the specific exclusions in new section 44F. That is, expenditures for developing new or significantly improved computer programs which otherwise would qualify for the section 44F credit are not to be disqualified solely because such costs are incurred in developing computer "software", rather than in developing "hardware".

Nonresearch expenditures.—The section 44F credit is not available for expenditures such as the costs of routine or ordinary testing or inspection of materials or products for quality control; of efficiency surveys or management studies; of consumer surveys (including market research), advertising, or promotions (including market testing or development activities); or of routine data collection. Also, costs incurred in connection with routine, periodic, or cosmetic alterations or improvements (such as seasonal design or style changes) to existing products, to production lines, or to other ongoing operations, or in connection with routine design of tools, jigs, molds, and dies, do not qualify as research expenditures under the credit.[3]

Exclusions

There are three express exclusions from the definition of qualified research for purposes of the section 44F credit.

First, expenditures for research which is conducted outside the United States do not enter into the credit computation.

Second, the credit is not available for research in the social sciences or humanities (including the arts), such as research on psychological or sociological topics or management feasibility studies.

Third, the credit is not available for research to the extent funded by any grant, contract, or otherwise by another person (or any governmental entity).

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[2] Thus, the credit limitations and definitional restrictions (such as the distinctions between research and nonresearch expenditures, and between direct and indirect expenditures) which apply in the case of product research costs also apply in the case of the costs of developing new or significantly improved computer software.

[3] The credit is not available for such expenditures as the costs of construction of copies of prototypes after construction and testing of the original model(s) have been completed; of preproduction planning and trial production runs; of engineering follow-through or troubleshooting during production; or of adaptation of an existing capability to a particular requirement or customer's need as part of a continuing commercial activity. For example, the costs of adapting existing computer software programs to specific customer needs or uses, as well as other modifications of previously developed programs, are not eligible for the credit.

Qualified in-house expenditures

Employee wages qualify for the credit if paid for engaging in the actual conduct of research, in the immediate supervision of the actual conduct of qualified research, or in the direct support of the actual conduct (or of the immediate supervision of the actual conduct) of qualified research. No amount of wages paid for overhead or for general and administrative services, or of indirect research wages, qualifies for the credit.

In addition, amounts paid for supplies used in the conduct of qualified research are eligible for the credit. The term "supplies" means any tangible property other than property of a character subject to the allowance for depreciation (cost recovery), land, or improvements to land. Finally, amounts paid for the right to use personal property in the conduct of qualified research generally qualify for the credit.

Contract research expenditures

In addition to the three categories of in-house research expenditures, 65 percent of amounts paid by the taxpayer for qualified research performed on behalf of the taxpayer enters into the incremental credit computation. The research firm, university, or other person which conducts the research on behalf of the taxpayer cannot claim any amount of the credit for its expenditures in performing the contract.

If any contract research amount paid or incurred during a taxable year is attributable to qualified research to be conducted after the close of that taxable year, that amount is treated as paid or incurred during the period during which the qualified research is actually conducted.

Expenditures for certain basic research

A special rule treats as qualified research expenditures 65 percent of certain corporate expenditures (including grants or charitable contributions) for basic research to be performed at a college, university, or other qualified organization pursuant to a written research agreement. Under this rule, a corporate taxpayer takes into account, for purposes of computing the incremental credit, 65 percent of qualifying basic research expenditures (subject to the contract research prepayment limitation).

Computation of allowable credit

General rule.—As a general rule, the section 44F credit applies to the amount of qualified research expenditures for the current taxable year which exceeds the average of the yearly qualified research expenditures in the preceding three taxable years. However, for the taxpayer's first taxable year to which the new credit applied (and which ended in 1981 or 1982), the credit applied to the amount of qualified research expenditures for that year which exceeded the amount of such expenditures in the preceding taxable year. Also, for the taxpayer's second taxable year to which the new credit applied (and which ended in 1982 or 1983), the credit applied to the amount of qualified research expenditures for that year which exceeded the average of yearly qualified research expenditures in the preceding two taxable years.[4]

New businesses.—If the taxpayer was not in existence during a base period year, then the taxpayer is treated as having research expenditures of zero in such year, for purposes of computing average annual research expenditures during the base period, subject to the 50-percent limitation rule.

50-percent limitation rule.—Base period research expenditures are treated as at least equal to 50 percent of qualified research expenditures for the current year.[5] This 50-percent limitation applies both in the case of existing businesses and in the case of newly organized businesses.

Aggregation rules.—To ensure that the section 44F credit will be allowed only for actual increases in research expenditures, special rules apply under which research expenditures of the taxpayer are aggregated with research expenditures of other persons for purposes of computing any allowable credit. These rules are intended to prevent artificial increases in research expenditures by shifting expenditures among commonly controlled or otherwise related persons.

Business ownership rules.—Special rules apply for computing the credit where a business changes hands, under which qualified research expenditures for periods prior to the change of ownership generally are treated as transferred with the trade or business which gave rise to those expenditures. These rules are intended to facilitate an accurate computation of base period expenditures and the credit by attributing research expenditures to the appropriate taxpayer.

Limitations and carryover

General limitation.—The amount of credit which may be used in a particular taxable year is limited to the taxpayer's income tax liability reduced by certain other nonrefundable credits.

Additional limitation on individuals.—In the case of an individual who owns an interest in an unincorporated trade or business, who is a beneficiary of a trust or estate, who is a partner in a partnership, or who is a shareholder in a subchapter S corporation, the amount of credit that can be used in a particular year also cannot exceed an amount (separately computed with respect to the person's interest in the trade or business or entity) equal to the amount of tax attributable to that portion of the person's taxable income which is allocable or apportionable to such interest.

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[4] Because the credit became effective for qualified research expenditures paid or incurred after June 30, 1981, a special rule was provided for computing base period expenditures for the taxpayer's taxable year which included July 1, 1981. A similar rule is to apply in the case of a taxpayer's first taxable year including December 31, 1985 (when the credit is scheduled to terminate).

[5] For example, assume that a calendar-year taxpayer is organized on January 1, 1983; makes qualified research expenditures of $100,000 for 1983; and makes qualified research expenditures of $260,000 for 1984. The new-business rule provides that the taxpayer is deemed to have base period expenditures of zero for pre-1983 years. Without regard to the 50-percent limitation, the taxpayer's base period expenditures for purposes of determining any credit for 1984 would be the average of its expenditures for 1981 (deemed to be zero), 1982 (deemed to be zero), and 1983 ($100,000), or $33,333. However, by virtue of the 50-percent limitation, the taxpayer's average base period expenditures are deemed to be no less than 50 percent of its current year expenditures ($260,000), or $130,000. Accordingly, the amount of 1984 qualified research expenditures qualifying for the credit is limited to $130,000, and the amount of the taxpayer's credit for 1984 is $32,500.

Carryover.—If the amount of credit otherwise allowable exceeds the applicable limitation, the excess amount of credit can be carried back three years (including carrybacks to years before enactment of the credit) and carried forward 15 years, beginning with the earliest year.

Effective date

Under present law, the section 44F credit applies to qualified research expenditures paid or incurred after June 30, 1981 and before January 1, 1986.

Explanation of the Bill (S. 738)

General rule

The bill would make permanent the section 44F credit for increased research expenditures.

Effective date

The provisions of the bill would be effective on enactment.

3. S. 1147—Senators Danforth, Tsongas, Symms, and Thurmond

"Mortgage Debt Forgiveness Tax Act of 1983"

Present Law

In general

Under present law, income is realized when indebtedness is forgiven or in other ways cancelled (Code sec. 61(a)(12)). For example, if a corporation has issued a $1,000 bond at par which it later repurchases for only $900, thereby increasing its net worth by $100, the corporation realizes $100 of income in the year of repurchase (*U.S.* v. *Kirby Lumber Co.*, 284 U.S. 1 (1931)).

Discharge of qualified business indebtedness

Present law provides an exclusion, at the taxpayer's election, of income from discharge of qualified business indebtedness (secs. 108(a)(1)(C), 1017). The latter term means indebtedness incurred or assumed (1) by a corporation or (2) by an individual in connection with property used in the individual's trade or business.

The amount so excluded must be applied to reduce the taxpayer's basis (but not below zero) in depreciable property or, at the taxpayer's election, in real property held by the taxpayer for sale to customers in the ordinary course of business. If the taxpayer disposes of property the basis of which has been reduced under these rules, the amount of the reduction is subject to recapture at ordinary income rates.

Discharge in bankruptcy or insolvency

Present law also provides an exclusion for income from a discharge of indebtedness occurring in a bankruptcy proceeding or when a taxpayer is insolvent (secs. 108(a)(1)(A) and (B), 1017).

The amount so excluded must be applied to reduce certain tax attributes of the taxpayer, including (in the order in which reduction is to occur) net operating losses and carryovers, carryovers of investment tax credit and certain other credits, capital losses and carryovers, basis of the taxpayer's assets (including depreciable and nondepreciable assets), and foreign tax credit carryovers. The basis of the taxpayer's assets may not be reduced below the amount of the taxpayer's remaining undischarged liabilities. Alternatively, the taxpayer may elect to apply the excluded amount first to reduce basis in depreciable property (or in real property held for sale to customers in the ordinary course of business). If the taxpayer disposes of property the basis of which has been reduced under these rules, the amount of the reduction is subject to recapture at ordinary income rates.

Discharge of mortgage indebtedness on personal residence

The Internal Revenue Service has ruled that a financially solvent taxpayer realizes income when he or she prepays the mortgage on a personal residence at less than the outstanding principal balance (Rev. Rul. 82-202, 1982-48 I.R.B. 5).

The ruling concerned a financial institution which offered a 10-percent discount to individuals who would prepay existing low-interest mortgages on their personal residences. The taxpayer had borrowed from the financial institution in order to purchase a residence from a third-party seller.[1] The fair market value of the residence was greater than the principal balance at the time of the transaction, and the taxpayer was not personally liable on the mortgage.

The ruling states that the taxpayer realized ordinary income to the extent of the 10-percent prepayment discount. The facts of the ruling did not involve bankruptcy, insolvency, or a qualified business indebtedness. Thus, the reduction of the taxpayer's liability produced taxable income under section 61(a)(12) and the *Kirby Lumber* rule. The ruling further added that the taxpayer would also realize ordinary income if (1) a discount was received for prepayment of only a portion of the outstanding balance of the mortgage, or (2) the taxpayer was personally liable on the mortgage.[2]

Explanation of the Bill

In general

The bill would provide for the exclusion of amounts otherwise includible in gross income by reason of the discharge (in whole or in part) of qualified mortgage indebtedness of the taxpayer. Qualified mortgage indebtedness would mean indebtedness incurred by an individual in acquiring the individual's principal residence, or in making improvements to the principal residence (if the costs of the improvements are taken into account in determining the taxpayer's basis). The amount excluded from income could not exceed the taxpayer's adjusted basis in the residence as of the close of the taxable year.

Under the bill, the taxpayer's basis in his or her principal residence would be reduced (but not below zero) by the amount of discharged indebtedness which was excluded from income under the new provision. If the taxpayer subsequently disposed of the principal residence in a taxable sale or exchange, any gain recognized would be recaptured as ordinary income to the extent of the excluded amount.

The term principal residence would have the same meaning as under section 1034 (relating to rollover of gain on sale of a principal residence). Under the section 1034 regulations, the determination of whether property constitutes the taxpayer's principal residence would be made on a facts and circumstances basis. Property used as a principal residence could include a houseboat, trailer, or stock in a cooperative housing corporation. However, the term principal residence would not include personal property (such as furniture) which is not treated under property law as a fixture (Treas. Reg. sec. 1034-1(c)(3)(i)).

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[1] Under sec. 108(e)(5), the reduction of debt of a financially solvent purchaser of property, if the debt arose out of the purchase of the property, is to be treated as a nontaxable purchase price adjustment, rather than as a discharge of indebtedness. However, this exception applies only to debt owed to the seller of the property. The exception is thus inapplicable to most mortgage loans.

[2] Rev. Rul. 82-202 concerned the amount of principal discount received by the taxpayer. Since interest payments are deductible, the forgiveness of mortgage interest payments generally does not result in gross income to a cash-basis taxpayer (sec. 108(e)(2)). However, the forgiveness of previously accrued and deducted interest results in realization of gross income.

Effective date

The bill would apply retroactively to taxable years beginning after December 31, 1953. Claims for retroactive credit or refund of overpayments arising by reason of the bill could be filed within the one-year period beginning on the date of enactment.

4. S. 1194—Senators Danforth, Symms, Chafee, Burdick, Pell, Wilson, Inouye, and Cohen

"Technology Education Assistance and Development Act of 1983"

and

5. S. 1195—Senators Bentsen and Chafee

"High Technology Research and Educational Development Act of 1983"

a. Increased Deduction for Transfers of Scientific, Technical, or Computer Equipment for Certain Research or Educational Purposes

Present Law

General reduction rule for donations of property

In general, the amount of charitable deduction otherwise allowable for donated property must be reduced by the amount of any ordinary gain which the taxpayer would have realized had the property been sold for its fair market value at the date of the contribution (Code sec. 170(e)).

Thus, a donor of inventory or other ordinary-income property (property the sale of which would not give rise to long-term capital gain) generally may deduct only the donor's basis in the property, rather than its full fair market value. In the case of property used in the taxpayer's trade or business (sec. 1231 property), the charitable dedution must be reduced by the amount of depreciation recapture which would be recognized on sale of the donated property.

Special rule for certain research equipment donations

Under a special rule, corporations are allowed an augmented charitable deduction for donations of newly manufactured scientific equipment or apparatus to a college or university for research use in the physical or biological sciences (sec. 170(e)(4), added by the Economic Recovery Tax Act of 1981).[1] This provision applies to charitable contributions made after August 13, 1981.

This increased deduction is generally for the sum of (1) the corporation's basis in the donated property and (2) one-half of the unrealized appreciation (i.e., one-half of the difference between the property's fair market value determined at the time of the contribution and the donor's basis in the property). However, in no event is the deduction under the special rule allowed for an amount which exceeds twice the basis of the property.

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[1] Under a special rule enacted in 1976, an augmented charitable deduction also is allowed for corporate contributions of certain types of ordinary income property donated for the care of the needy, the ill, or infants (sec. 170(e)(3)).

To qualify for this special deduction rule, a corporate contribution of scientific equipment to a college or university must satisfy the following requirements:

(1) The property contributed was constructed by the corporate donor;[2]

(2) The contribution is made within two years of substantial completion of construction of the property;

(3) The original use of the property is by the college or university;

(4) Substantially all (at least 80 percent) of the use of the scientific equipment or apparatus by the college or university is for research (within the meaning of sec. 174), or for research training, in the United States in the physical or biological sciences;[3]

(5) The property is not transferred by the donee in exchange for money, other property, or services; and

(6) The taxpayer receives the donee's written statement representing that the use and disposition of the property contributed will be in accordance with the last two requirements.

Prior Committee Action

In the 97th Congress, the Committee on Finance reported, with amendments, a bill (H.R. 5573) which would have provided a special deduction rule for certain corporate charitable contributions of newly manufactured computer equipment to an elementary or secondary school for use at the school, or to a museum or library for use at the museum or library, directly in the education of elementary or secondary schoolchildren (S. Rep. No. 97-647). No further action was taken on that bill prior to adjournment of the 97th Congress.

Requirements for favorable treatment

The special deduction rule of H.R. 5573 would have applied to a charitable contribution by a corporation of computer equipment which satisfied all of the following requirements.

1. Qualifying computer equipment

The donated property must be tangible personal property which is inventory and must be computer equipment as defined in H.R. 5573. Also, the donated computer equipment must be assembled by the taxpayer, and the taxpayer must be regularly engaged in the business of assembling and selling equipment of the same kind as the donated property.

H.R. 5573 defined computer equipment qualifying for the special deduction rule to mean only—

(a) a data processor which could be programmed in at least three standard computer languages, which has a random access memory

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[2] Property is to be treated as constructed by the taxpayer only if the cost of parts (other than parts manufactured by the taxpayer or a related person) used in construction does not exceed 50 percent of the taxpayer's basis in the property.

[3] For purposes of this limitation on research use, and on research training use, the physical sciences include physics, chemistry, astronomy, mathematics, and engineering, and the biological sciences include biology and medicine.

with a capacity for at least 32,000 bytes, and which is (or could be) connected with a screen for visual display of the data;

(b) a display screen, a printer, or a disc drive, but only if donated by the taxpayer together with the donated data processor; and

(c) related installation equipment.

2. Eligible donees

The computer equipment must be donated to a qualified oranization (located in the United States), defined by H.R. 5573 to mean—

(a) an educational organization (within the meaning of sec. 170(b)(1)(A)(ii);[4]

(b) an elementary or secondary school operated as an activity of a tax-exempt section 501(c)(3) organization (such as a church), provided that such school normally maintains a regular faculty and curriculum and normally has a regularly enrolled body of pupils or students in attendance at the place where its educational activities are regularly carried on; or

(c) a tax-exempt museum or library which is described in section 501(c)(3), which is operated by a governmental unit, or which is operated as an activity of a section 501(c)(3) organization.

3. Governing body

The contribution of computer equiptment to an eligible donee must be made through the donee's governing body.

4. Time of contribution

The contribution must be made within six months after substantial completion of construction of the computer equipment. For any one donor corporation, only contributions made during a single taxable year of the corporation beginning in 1983, in 1984, or in 1985 would be eligible for the special rule in H.R. 5573.

5. Limitation to new equipment

The original use of the donated computer equipment must be by the donee.

6. Schoolchild education use requirement

Substantially all (at least 80 percent) of the use of the donated computer equipment by the donee must be at the location of the donee and must be directly in the education of elementary and secondary schoolchildren.

7. Prohibition on donee sale

The donated computer equipment may not be transferred by the donee in exchange for money, other property, or services.

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[4] An educational organization is described in sec. 170(b)(1)(A)(ii) "if its primary function is the presentation of formal instruction and it normally maintains a regular faculty and curriculum and normally has a regularly enrolled body of pupils or students in attendance at the place where its educational activities are regularly carried on. The term includes institutions such as primary, secondary, preparatory, or high schools, and colleges and universities", and includes both public and private schools (Reg. sec. 1.170A-9(b)(1)).

8. Written confirmation

The donor corporation must receive a written statement from the donee representing that the use and disposition of the donated computer equipment would be in accordance with the preceding two requirements.

9. Distributional requirements

All contributions by any one donor corporation must be made pursuant to a written plan of the donor under which there would not be undue concentrations of the donor's contributions of computer equipment from either a geographic standpoint or from the standpoint of the relative economic status of the students of the donees which receive contributions from the donor. These distributional requirements under H.R. 5573 were intended to insure a widespread distribution of donated property which would benefit a wide cross-section of elementary and secondary schoolchildren.

Allowable deduction

If all the requirements of H.R. 5573 were satisfied, the charitable deduction allowed by that bill for a charitable contribution of qualifying computer equipment generally would be for the sum of (1) the taxpayer's basis in the property plus (2) one-half of the unrealized appreciation (i.e., one-half of the difference between the property's fair market value[5] determined at the time of the contribution and the donor's basis in the property). However, in no event is a deduction allowed for any amount in excess of 150 percent of the donor's basis in the property.

Explanation of Section 2, S. 1194

Overview

S. 1194 would delete from the section 170 charitable deduction rules a special provision (Code sec. 170(e)(4)), enacted in ERTA, which allows an augmented charitable deduction (up to twice the taxpayer's basis) for corporate donations of newly manufactured scientific equipment to colleges or universities for research use in the physical or biological sciences. The bill would enact a new deduction provision, generally of broader scope, outside the charitable deduction rules.

Under the new provision, a corporation would receive deductions for amounts in excess of its basis for transfers, without consideration, of scientific or technical equipment (including property used in the transferor's business and computer software) to colleges or universities, for use in either research or education in certain sciences or vocational education fields, and for transfers, without consideration, of newly manufactured computer equipment (including software) to secondary or elementary schools, museums, libraries, or correctional institutions, for use in education. In addition, augmented deductions would be allowed for the costs of performing certain maintenance and repair services in connection with such property transfers. In the case of scientific equipment transferred to colleges or univiersities, only an item having a retail value exceeding $500 ($250 for computer software) generally would be eligible for the new augmented deduction.

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[5] Where donated property is a type which the taxpayer sells in the course of its business, the fair market value is the price which the taxpayer would have received if the taxpayer had sold the contributed property in the usual market in which it customarily sells, at the time and place of the contribution, and, in the case of a contribution of goods in quantity, in the quantity contributed. The usual market of a manufacturer or other producer consists of the wholesalers or any other distributors to or through whom it customarily sells; but if it sells only at retail, the usual market consists of its retail customers (Reg. sec. 170A-1(c)(2)).

The augmented deduction under S. 1194 generally would not be allowed to the extent that, determined on a product-by-product basis, the number of transferred items exceeds 20 percent of the number of such items sold by the taxpayer during the year. Also, while the transfers would not be required to qualify as charitable contributions[6] in order for the augmented deduction to apply, the taxpayer's aggregate deduction in one year for both charitable contributions and transfers under the new provision would be limited to 10 percent of taxable income (computed with certain modifications), with a five-year carryforward of any excess.

In the case of computer equipment transfers to secondary schools, etc., the augmented deduction would apply only during the five-year period beginning on enactment of the bill. Also, S. 1194 would require that the transferor of such computer equipment, at no cost to the recipient school, etc., generally must provide sufficient orientation to make at least one employee of the recipient per data processor proficient in use of the transferred property in the direct education of students.

Transfers of qualified scientific property

The augmented deduction under S. 1194 would apply to a transfer, without consideration, by a corporation[7] of tangible personal property which is inventory (sec. 1221(1)), of computer software, or of property used in the transferor's business (sec. 1231(b)), and to the performance of services in connection with such transferred property, which satisfies all of the following requirements.

1. Qualified scientific property

The transferred property must be scientific or technical equipment or apparatus, or replacement parts for such equipment. In the case of transferred inventory, the property must be assembled by the taxpayer, and the taxpayer must be regularly engaged in the business of assembling and selling or leasing property of that type.

Substantially all (at least 80 percent) the use of the transferred property must be for the direct education of students or faculty, for research (within the meaning of sec. 174), or for research training. Also, the use of the property must be in the United States and must be in mathematics, in the physical or biological/biomedical sciences, engineering, computer science, or certain categories of vocational education (computer and information services, science technology, engineering and engineering-related technologies, and precision production-drafting and precision metalwork).

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[6] Court cases have held that if a transfer to a charitable organization results in a benefit to the donor, no charitable deduction is allowed under section 170. For example, the U.S. Court of Claims has upheld denial of charitable deductions claimed by a manufacturer for discounts on purchase of sewing machines by schools, where the court had found that the discounts were offered for the predominant purpose of enlarging the market for the manufacturer's brand of sewing machines (*Singer Co.* v. *U.S.*, 449 F.2d 413 (Ct. Cl. 1971)).

[7] For this purpose, the term corporation does not include S corporations (sec. 1361(a)), personal holding companies (sec. 542), or service organizations (sec. 414(m)(3)).

Except for replacement parts, only single units of qualified scientific property having a retail value in excess of $500 ($250 in the case of computer software) would qualify for an augmented deduction. Property which had been used in the transferor's business would qualify only if it is functional and usable without need of any repair, reconditioning, or other investment by the recipient. All transferred property would have to be accompanied by the same warranties as normally provided by the manufacturer in connection with a sale of the transferred scientific property.

2. Qualified services

S. 1194 would define qualified services as the performance of maintenance, repair, reconditioning, or similar services which the transferor furnishes, pursuant to a standard contract with the recipient, in connection with a transfer of qualified scientific property.

3. Eligible recipients

The qualified scientific property must be transferred to—

(a) an educational organization (within the meaning of sec. 170(b)(1)(A)(ii))[8] which is an institution of higher education (within the meaning of sec. 3304(f));[9] or

(b) an association at least 80 percent of whose members are such institutions of higher education.

The transfer could be made directly to the organization or association, or through a clearinghouse for used scientific property (as defined in S. 1194).[10] In either case, the transfer must be made through the recipient's governing body.

4. Time of transfer/original use

In the case of inventory property, the transfer must be made within six months after substantial completion of assembly of the property. Also, the original use of the property must be by the recipient.

In the case of tangible property used in the transferor's business, the transfer must be made within three years after the property is first placed in service by the taxpayer.

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[8] See note 4, *supra*.

[9] Sec. 3304(f) defines "institution of higher education" as an educational institution which (1) admits as regular students only individuals having a certificate of graduation from a high school, or the recognized equivalent of such a certificate; (2) is legally authorized to provide a program of education beyond high school; (3) provides an educational program for it which awards a bachelor's or higher degree, or provides a program which is acceptable for full credit toward such a degree, or offers a program of training to prepare students for gainful employment in a recognized occupation; and (4) is a public or other nonprofit institution.

[10] The bill refers to a clearinghouse to be established and administered by the National Technical Information Service of the Department of Commerce. The clearinghouse would publish in the Federal Register, at least once a month, descriptions of used scientific property which corporations wish to contribute under the augmented deduction provision, for the purpose of assisting colleges, etc. to identify potential transferors of scientific equipment which they need.

If scientific equipment used in the taxpayer's business is listed with the clearinghouse within three years after first being placed in service, and then transferred to a qualifying recipient within six months of the listing, the property would be deemed under the bill to have met the requirement that used scientific equipment must be transferred within three years after being placed in service.

5. Restrictions on recipients

S. 1194 would provide that the transferred property may not be retransferred by the recipient, during the ACRS life of the property, in exchange for money, other property, or services.

The transferor must obtain a written statement from the recipient, executed under penalties of perjury, representing that the latter's use and disposition of the property will be in accordance with the requirements for the augmented deduction. In the case of a transfer of property used in the taxpayer's business, the recipient must also state that the property will be functional and usable without need of any repair, reconditioning, or other investment.

Transfers of qualified computer equipment

The augmented deduction under S. 1194 also would apply to a transfer, without consideration, by a corporation[11] of computer equipment (including software) which is inventory property (sec. 1221(1)), and to the performance of services in connection with such transferred computer equipment, which satisfies all of the following requirements.

1. Qualified computer equipment

The transferred property must be computer equipment as defined in the bill, i.e., any of the following—

(a) A data processor which will support at least three computer languages; which has a random access memory with a capacity for at least 16,000 bytes (expandable to at least 48,000 bytes); which is accompanied by a screen for visual display of the data; and which is suitable for educational use.

(b) Ancillary computer equipment transferred for use in connection with such a data processor (whether the processor was contributed by the taxpayer or already owned by the recipient). Only display screens, printers, or disc drives qualify in this category.

(c) Any installation equipment or replacement parts for a qualifying data processor or qualifying ancillary computer equipment.

(d) Computer software which is suitable for use in instructional applications in the educational environment in which the data processor is to be used.

Except for computer software, the transferred property must have been assembled by the taxpayer, and the taxpayer must be regularly engaged in the business of assembling and selling or leasing of computer equipment of the same kind.

Substantially all (at least 80 percent) the use of the transferred property by the recipient must be at its institutions directly in the education of students or teachers, and must be in the United States. The transferred property would have to be accompanied by the same warranties as normally provided by the manufacturer in connection with a sale of the computer equipment of that type.

2. Qualified services

S. 1194 would define qualified services as the performance of maintenance, repair, reconditioning, or similar services which the transferor furnishes, pursuant to a standard contract with the recipient, in connection with a transfer of qualified computer property.

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[11] See note 7, *supra*.

3. Eligible recipients

Under the bill, the qualified computer equipment must be transferred (through the recipient's governing body) to—

(a) an educational organization (within the meaning of sec. 170(b)(1)(A)(ii))[12] which is not an institution of higher education (as defined in sec. 3304(f));[13]

(b) an elementary or secondary school operated as an activity of a tax-exempt section 501(c)(3) organization (such as a church), provided that such school normally maintains a regular faculty and curriculum and normally has a regularly enrolled body of pupils or students in attendance at the place where its educational activities are regularly carried on; or

(c) a tax-exempt museum, library, or correctional institution which is operated either as an activity of a section 501(c)(3) organization or by a section 170(c)(1) governmental unit.

4. Time of transfer/original use

The transfer must be made within six months after assembly of the computer equipment has been substantially completed, and the original use of the property must be by the recipient. Also, the computer equipment transfer must be made within the five-year period beginning on the date of enactment of the provision.

5. Restrictions on recipients

The transferred computer equipment could not be retransferred by the recipient, during the property's ACRS life, in exchange for money, other property, or services.

The transferor must obtain a written statement from the recipient, executed under penalties of perjury, representing that its use and disposition of the property will be in accordance with requirements for the augmented deduction. In the case of a transfer of computer software, the statement must represent that the software is compatible with data processors owned by the recipient and is suitable for use in its educational programs. In the case of a transfer of ancillary computer equipment, the statement must represent that the equipment is compatible with data processors which the school owns or will receive from the transferor.

6. Distributional requirements

The transfer of computer equipment must be made pursuant to a written plan under which there will be diversity in the distribution of all computer equipment transferred by the taxpayer both on a geographical basis and on the basis of the relative economic status of the students of all recipients which receive such transfers.

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[12] See note 4, *supra.*

[13] See note 9, *supra.*

7. Required orientation services

S. 1194 would require that the transferor, at no cost to the recipient or its employees, must provide sufficient orientation to make at least one such employee per data processor proficient in the use of the transferred property in the direct education of students or teachers. The orientation program must be conducted by employees of the transferor, or by any other competent person authorized by the transferor, at a location determined pursuant to agreement with the recipient.

The determination of the degree of orientation required to meet the standard is to be made by agreement between the transferor and the recipient. In general, the program must provide at least three hours of orientation per transferred data processor. However, this minimum will not apply if the school determines that its employees have sufficient knowledge of the transferred property to justify less than three hours of orientation.

Allowable deduction

The amount of deduction allowed for transfers of qualified scientific property or qualified computer equipment meeting the requirements of S. 1194 would be as follows:

(a) Tangible inventory property.—Fair market value, but limited to the lesser of (a) twice the taxpayer's basis in the property or (b) the sum of the taxpayer's basis in the property plus one-half of the unrealized appreciation (i.e., one-half of the difference between the property's fair market value determined at the time of the transfer and the basis in the property).

(b) Tangible property used in the transferor's business.—150 percent of the taxpayer's basis in the property, computed with certain adjustments.

(c) Qualified services.—The lesser of (a) the fair market value of such services (as determined by the amount normally paid by customers for such services) or (b) 150 percent of the taxpayer's direct costs of providing such services.

(d) Purchased computer software.—Fair market value of the software, determined at the time of transfer.

(e) Developed computer software.—50 percent of the fair market value of the software, determined at the time of transfer.

In the case of required orientation services with respect to transfers of computer equipment, the taxpayer's direct costs of providing such services are to be added to the basis of the transferred computer equipment property for purposes of computing the augmented deduction under the above rules for tangible inventory.

Special limitations

Under S. 1194, an augmented deduction would not be allowed to the extent that, determined on a product-by-product basis, the total of transfers in the taxable year by the taxpayer of qualified computer equipment property or qualified scientific property (excluding property used in the taxpayer's business) exceeds 20 percent of the number of units of such product sold by the taxpayer in the ordinary course of its business in that taxable year.

Also, while transfers of scientific or computer equipment property would not have to qualify as charitable contributions[14] in order for the augmented deduction to apply, the taxpayer's aggregate deduction for charitable contributions under section 170 and transfers under the new provision could not exceed 10 percent of the taxpayer's taxable income (computed with certain modifications). Any amount of an augmented deduction exceeding this limitation could be carried forward in the same manner as an excess charitable deduction (i.e., the excess could be carried forward to the five succeeding taxable years, subject to the percentage limitation in those years).

Effective date

The provisions of section 2 of S. 1194 would be effective for taxable years beginning after enactment of the bill.

Explanation of Section 2, S. 1195

Overview

S. 1195 would delete from the section 170 charitable deduction rules a special provision (Code sec. 170(e)(4)), enacted in ERTA, which allows an augmented charitable deduction (up to twice the taxpayer's basis) for corporate donations of newly manufactured scientific equipment to colleges or universities for research use in the physical or biological sciences. The bill would enact a new deduction provision, generally of broader scope, outside the charitable deduction rules.

Under the new provision, a corporation would receive deductions for amounts in excess of its basis for transfers, without consideration, of scientific or technical equipment (including property used in the transferor's business and computer software) to colleges, universities, or vocational education schools or programs, for use in either research or education in certain scientific or technological fields, and for transfers, without consideration, of newly manufactured computer equipment (including software) to secondary or elementary schools, for use in education. In addition, augmented deductions would be allowed for the costs of performing certain maintenance and repair services in connection with such property transfers. With certain exceptions, only an item having a value exceeding $250 would be eligible for the new augmented deduction.

The augmented deduction under S. 1195 generally would not be allowed to the extent that, determined on a product-by-product basis, the number of transferred items exceeds 20 percent of the number of such items sold by the taxpayer during the year. Also, while the transfers would not be required to qualify as charitable contributions[15] in order for the augmented deduction to apply, the taxpayer's aggregate deduction in one year for both charitable contributions and transfers under the new provision would be limited to 10 percent of taxable income (computed with certain modifications), with a five-year carryforward of any excess.

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[14] See note 6, *supra*.

[15] See note 6, *supra*.

In the case of computer equipment transfers to schools, the augmented deduction would apply only during the five-year period beginning on enactment of the bill. Also, S. 1195 would require that the transferor of such computer equipment must provide, at no cost to the school or its teachers, sufficient orientation to make at least one teacher per data processor proficient in use of the transferred property in the direct education of students.

Transfers of qualified scientific property

The augmented deduction under S. 1195 would apply to a transfer, without consideration, by a corporation[16] of tangible personal property which is inventory (sec. 1221(1)), of computer software, or of property used in the transferor's business (sec. 1231(b)), and to the performance of services in connection with such transferred property, which satisfies all of the following requirements.

1. Qualified scientific property

The transferred property must be scientific or technical equipment (or similar property or apparatus), or replacement parts for such equipment. In the case of transferred inventory, at least 50 percent of the item must have been assembled by the taxpayer, and the taxpayer must be regularly engaged in the business of assembling and selling property of that type.

Substantially all (at least 80 percent) the use of the transferred property must be for the direct education of students or faculty, for research (within the meaning of sec. 174), or for research training. Also, the use of the property must be in the United States and must be in the physical, computer, and biological sciences or technologies, engineering and engineering technologies, mathematics, or electronic and automatic industrial, medical, and agricultural equipment and instrumentation operation.

Except for computer software or replacement parts, only transferred property having a value in excess of $250 would qualify for an augmented deduction. Property which had been used in the transferor's business would qualify only if it is functional and usable without need of any repair, reconditioning, or other investment by the educational organization. All transferred property would have to be accompanied by the same warranties as normally provided by the manufacturer in connection with a sale of the transferred scientific property.

2. Qualified services

S. 1195 would define qualified services as the performance of maintenance, repair, reconditioning, or similar services which the transferor furnishes, pursuant to a standard contract with the recipient, in connection with a transfer of qualified scientific property.

3. Eligible recipients

Under the bill, the qualified scientific property must be transferred (through the recipient's governing body) to—

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[16] See note 7, *supra*.

(a) an educational organization (within the meaning of sec. 170(b)(1)(A)(ii))[17] which is an institution of higher education (within the meaning of sec. 3304(f));[18]

(b) a secondary school offering vocational education programs; or

(c) an area vocational school (as defined in P.L. 94-482).[19]

4. Time of transfer/original use

In the case of inventory property, the transfer must be made within six months after substantial completion of assembly of the property. Also, the original use of the scientific equipment must be by the recipient educational organization.

In the case of tangible property used in the transferor's business, the transfer must be made within three years after the property is first placed in service by the taxpayer.

5. Restrictions on recipients

S. 1195 would provide that transferred property may not be retransferred by the educational organization within five years after receipt in exchange for money, other property, or services.

The transferor must obtain a written statement from the educational organization, executed under penalties of perjury, representing that the latter's use and disposition of the property will be in accordance with the requirements for the augmented deduction. In the case of a transfer of property used in the taxpayer's business, the recipient also must state that the property will be functional and usable without need of any repair, reconditioning, or other investment.

Transfers of qualified computer equipment

The augmented deduction under S. 1195 would also apply to a transfer, without consideration, by a corporation[20] of computer equipment (including software) which is inventory property (sec. 1221(1)), and to the performance of services in connection with such transferred computer equipment, which satisfies all of the following requirements.

1. Qualified computer equipment

The transferred property must be computer equipment as defined in the bill, i.e., any of the following—

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[17] See note 4, *supra*.

[18] See note 9, *supra*.

[19] The term area vocational school means (a) a specialized high school used principally to provide vocational education to persons available for study in preparation for entering the labor market; (b) the department of a high school principally used to provide vocational education in at least five different occupational fields to such persons available for study in preparation for entering the labor market; (c) a technical or vocational school used principally to provide vocational education to persons who have completed or left high school and who are available for study in preparation for entering the labor market; or (d) the department or division of a junior college or community college or university operating under the policies of the State board and which provides vocational education in at least five different occupational fields, leading to immediate employment but not necessarily leading to a baccalaureate degree, if it is available to all residents of the State or an area of the State designated and approved by the State board, and if, in the case of a school, department, or division described in (c) or (d), if it admits as regular students both persons who have completed high school and persons who have left high school (20 U.S.C. sec. 2461(2)).

[20] See note 7, *supra*.

(a) A data processor which will support at least three computer languages; which has a random access memory with a capacity for at least 16,000 bytes (expandable to at least 48,000 bytes); which is accompanied by a screen for visual display of the data; and which is suitable for educational use.

(b) Ancillary computer equipment transferred for use in connection with such a data processor (whether the processor was contributed by the taxpayer or already owned by the recipient). This category includes only display screens, printers, disc drives, and computer software which is suitable for use in instructional applications in the educational environment in which the data processor is to be used.

(c) Any installation equipment or replacement parts for a qualifying data processor or qualifying ancillary computer equipment.

Except for computer software, at least 50 percent of the transferred property must have been assembled by the taxpayer, and the taxpayer must be regularly engaged in the business of assembling and selling of computer equipment of the same kind.

Substantially all (at least 80 percent) the use of the transferred property by the recipient must be at its institutions directly in the education of students, and must be in the United States. Except in the case of installation equipment or replacement parts, only items having a value in excess of $250 would qualify for an augmented deduction. All transferred property would have to be accompanied by the same warranty as normally provided by the manufacturer in connection with the sale of the transferred property.

2. Qualified services

S. 1195 would define qualified services as the performance of maintenance, repair, reconditioning, or similar services which the transferor furnishes, pursuant to a standard contract with the recipient, in connection with a transfer of qualified computer property.

3. Eligible recipients

Under the bill, the qualified computer equipment must be transferred (through the recipient's governing body) to—

(a) an educational organization (within the meaning of sec. 170(b)(1)(A)(ii))[21] which is not an institution of higher education (as defined in sec. 3304(f)); or[22]

(b) an elementary or secondary school operated as an activity of a tax-exempt section 501(c)(3) organization (such as a church), provided that such school normally maintains a regular faculty and curriculum and normally has a regularly enrolled body of pupils or students in attendance at the place where its educational activities are regularly carried on.

4. Time of transfer/original use

The transfer must be made within six months after assembly of the computer equipment has been substantially completed, and the original use of the property must be by the school. Also, the computer equipment transfer must be made within the five-year period beginning on the date of enactment of the provision.

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[21] See note 4, *supra*.

[22] See note 9, *supra*.

5. Restrictions on schools

The transferred computer equipment could not be retransferred at any time by the school in exchange for money, other property, or services.

The transferor must obtain a written statement from the school, executed under penalties of perjury, representing that the school's use and disposition of the property will be in accordance with requirements for the augmented deduction. In the case of a transfer of ancillary computer equipment (including software), the transferor also must obtain a written finding by the school that the equipment is compatible with data processors which the school holds.

6. Distributional requirements

The transfer of computer equipment must be made pursuant to a written plan under which there will be no undue concentration of the taxpayer's transfers of computer equipment (or qualified scientific property), either on a geographical basis or on the basis of the relative economic status of the students of all schools which receive such transfers from the taxpayer.

7. Required orientation services

S. 1195 would require that the transferor, at no cost to the school or its teachers, must provide sufficient orientation to make at least one teacher per data processor proficient in the use of the transferred property in the direct education of students.

The orientation program must be conducted by employees of the transferor, or by any other competent person authorized by the transferor, at a location determined by agreement with the school. The determination of the degree of orientation required to meet the standard in the bill is to be made by agreement between the transferor and the school.

Allowable deduction

The amount of deduction allowed for transfers of qualified scientific property or qualified computer equipment meeting the requirements of S. 1195 would be as follows:

(a) Tangible inventory property.—Fair market value, but limited to the lesser of (a) twice the taxpayer's basis in the property or (b) the sum of the taxpayer's basis in the property plus one-half of the unrealized appreciation (i.e., one-half of the difference between the property's fair market value determined at the time of the transfer and the basis in the property).

(b) Tangible property used in the transferor's business.—150 percent of the taxpayer's basis in the property, computed with certain adjustments.

(c) Qualified services.—The lesser of (a) the fair market value of such services (as determined by the amount normally paid by customers for such services) or (b) 150 percent of the taxpayer's costs of providing such services.

(d) Purchased computer software.—Fair market value of the software, determined at the time of transfer.

(e) Developed computer software.—50 percent of the fair market value of the software, determined at the time of transfer.

In the case of required orientation services with respect to transfers of computer equipment, the taxpayer's costs of providing such services are to be added to the basis of the transferred computer equipment property for purposes of computing the augmented deduction under the above rules for tangible inventory.

Special limitations

Under S. 1195, the augmented deduction would not be allowed to the extent that, determined on a product-by-product basis, the total of transfers in the taxable year by the taxpayer of qualified computer equipment property or qualified scientific property, exceeds 20 percent of the number of units of such product sold by the taxpayer in the ordinary course of its business in that taxable year.

Also, while transfers of scientific or computer equipment property would not have to qualify as charitable contributions[23] in order for the augmented deduction to apply, the taxpayer's aggregate deduction for charitable contributions under section 170 and transfers under the new provision could not exceed 10 percent of the taxpayer's taxable income (computed with certain modifications). Any amount of an augmented deduction exceeding this limitation could be carried forward in the same manner as an excess charitable deduction (i.e., the excess could be carried forward to the five succeeding taxable years, subject to the percentage limitation in those years).

Effective date

The provisions of section 2 of S. 1195 would be effective for taxable years beginning after enactment of the bill.

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[23] See note 6, *supra*.

b. Expansion of Section 44F Credit

Present Law

Overview

An income tax credit is allowed for certain qualified research expenditures made by a taxpayer during the taxable year in carrying on a trade or business (Code sec. 44F, enacted in ERTA). The section 44F credit applies to such qualified research expenditures paid or incurred after June 30, 1981 and before January 1, 1986, when the credit is scheduled to expire.

The credit applies only to the extent that the taxpayer's qualified research expenditures for the taxable year exceed the average amount of the taxpayer's yearly qualified research expenditures in the specified base period (generally, the preceding three taxable years). The rate of the credit is 25 percent of the incremental research expenditure amount.

For purposes of the credit, the definition of research is the same as that used for purposes of Code section 174 (allowing current deductions for certain research expenditures), but subject to specified exclusions. Under present law, research expenditures eligible for the section 44F incremental credit consist of (1) "in-house" expenditures by the taxpayer for research wages and supplies used in research, plus certain amounts paid for research use of laboratory equipment, computers, or other personal property; (2) 65 percent of amounts paid by the taxpayer for contract research conducted on the taxpayer's behalf; and (3) if the taxpayer is a corporation, 65 percent of the taxpayer's expenditures (including grants or contributions) pursuant to a written research agreement for basic research to be performed by universities or certain scientific research organizations.

Expenditures for basic research

Under present law, corporations may take into account, for purposes of computing the section 44F credit for a taxable year, 65 percent of qualifying basic research expenditures for that year (subject to the contract research prepayment limitation).[24] Similarly, this amount is treated as research expenditures in a base period year when calculating the credit in subsequent years.

The special rule for basic research applies only to corporate[25] expenditures paid or incurred pursuant to a written research agreement between the taxpayer corporation and a college or university, certain tax-exempt scientific research organizations, and certain qualified funds (organized exclusively to make basic research grants to colleges and universities).

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[24] If any contract research amount paid or incurred during a taxable year is attributable to qualified research to be conducted after the close of that taxable year, that amount is treated as paid or incurred in the year or years during which the qualified research is actually conducted.

[25] See note 7, *supra*.

For purposes of this special rule, the term "basic research" means any original investigation for the advancement of scientific knowledge not having a specific commercial objective. However, the term basic research does not include expenditures for any activity excluded from the section 44F definition of qualified research, e.g., expenditures for basic research in the social sciences or humanities (including the arts).

Computation of base period expenditures

General rule.—As a general rule, the section 44F credit applies to the amount of qualified research expenditures for the current taxable year which exceeds the average of the yearly qualified research expenditures in the preceding three taxable years. However, for the taxpayer's first taxable year to which the new credit applied (and which ended in 1981 or 1982), the credit applied to the amount of qualified research expenditures for that year which exceeded the amount of such expenditures in the preceding taxable year. Also, for the taxpayer's second taxable year to which the new credit applied (and which ended in 1982 or 1983), the credit applied to the amount of qualified research expenditures for that year which exceeded the average of yearly qualified research expenditures in the preceding two taxable years.

Because the credit became effective for qualified research expenditures paid or incurred after June 30, 1981, a special rule was provided for computing base period expenditures with respect to the taxpayer's taxable year which included July 1, 1981. A similar rule is to apply in the case of a taxpayer's taxable year which includes December 31, 1985 (when the credit is scheduled to expire).

New businesses.—If the taxpayer was not in existence during a base period year, then the taxpayer is treated as having research expenditures of zero in such year, for purposes of computing average annual research expenditures during the base period, subject to the 50-percent limitation rule.

50-percent limitation rule.—Base period research expenditures are treated as at least equaling 50 percent of qualified research expenditures for the current year. This 50-percent limitation applies both in the case of existing businesses and in the case of newly organized businesses.

Illustration of computation

Assume that a corporation makes qualified in-house research expenditures totalling $120 million in each of the years 1980, 1981, and 1982. In addition, in 1981 the corporation makes a $6 million grant to a university for qualifying basic research; all of this amount is expended by the university in that year. In 1983, the corporation makes qualified in-house research expenditures totalling $130 million and also contributes $3 million to a university for basic research pursuant to a written research agreement. The university expends 50 percent of the 1983 contribution funds during 1983 and the rest during 1984.

Under these facts, the corporation's qualified research expenditures for 1983 would equal $130 million *plus* 65 percent of $1.5 million ($975,000). The corporation's base period expenditures with respect to 1983 would be the average of its qualified research expenditures for 1980, 1981, and 1982, or $121,300,000. Accordingly, the 25 percent credit for 1983 would apply to the excess of total current-year expenditures ($130,975,000) over the base period average ($121,300,000), or $9,675,000.

Assume further that in 1984 the total of the corporation's qualified in-house research expenditures increases to $135 million, and that the corporation makes no new basic research expenditures. The corporation is treated as having qualifying basic research expenditures in 1984 equal to 65 percent of $1.5 million, or $975,000. The corporation's base period expenditures with respect to 1984 would be the average of qualified research expenditures for 1981 ($123,900,000), 1982 ($120 million), and 1983 ($130,975,000). Accordingly, the 25 percent credit for 1984 would apply to the excess of current-year expenditures ($135,975,000) over the base period average ($124,958,333), or $11,016,667.

Explanation of Section 3, S. 1194

Expenditures for faculty wages and student loans

In general

Under section 3 of the bill, the category of expenditures eligible for a 25-percent credit under Code section 44F would be expanded also to include 65 percent of amounts paid or incurred[26] by a corporation[27] to a college or university, pursuant to written agreement, for scientific education uses. The latter term would mean the education of students or faculty in mathematics, engineering, computer science, and the physical and biological/biomedical sciences.

To qualify as scientific education expenditures, the amounts would have to be used by the educational institution for payment of wages to faculty employees who are directly engaged in providing scientific education, or for funding scholarships or loans for students at the institution who possess a bachelor's degree or its equivalent and who are engaged in postgraduate study in mathematics, the physical or biological/biomedical sciences, engineering, or computer science. In addition, amounts to be used for wages would have to be paid to the college or university pursuant to a written agreement which obligates the taxpayer to render a like or greater amount to the recipient for at least three consecutive years.

Eligible recipients for credit purposes

S. 1194 would define qualified organizations for certain section 44F credit purposes to mean—

(1) an educational organization (as described in section 170(b)(1)(A)(ii))[28] which is an institution of higher education (as defined in sec. 3304(f));[29]

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[26] The bill would repeal the contract research prepayment rule of present law (see note 24, *supra*).

[27] See note 7, *supra*.

[28] See note 4, *supra*.

[29] See note 9, *supra*.

(2) a tax-exempt organization which is organized primarily to conduct scientific research, which is described in section 501(c)(3), and which is not a private foundation; or

(3) an organization which is organized primarily to promote scientific research or scientific education by qualified organizations, which expends on a current basis substantially all its funds through grants and contracts for basic research or scientific education by a qualified organization, and which is described in either section 501(c)(3) or section 501(c)(6).

Special limitation

Corporate expenditures for scientific education would be eligible for the section 44F credit only to the extent exceeding the average of all charitable contributions made by the taxpayer to colleges and universities during the three preceding taxable years, excluding such contributions which were designated by the taxpayer for scientific education use (as defined for purposes of the credit, as would be amended by the bill).

Exclusion of payments from base period determinations

Under S. 1194, corporate expenditures for either basic research or scientific education which were included in the section 44F credit computation in a prior taxable year would be excluded, in calculating incremental expenditures in the taxable year, from the amount of base period expenditures for that prior year. Thus, as long as the taxpayer did not decrease the amount of its other expenditures qualifying under section 44F, the 25-percent credit would apply to 65 percent of all the taxpayer's qualifying basic research and qualifying scientific education expenditures in the current year (determined after application of the special limitation described above), whether the taxpayer had increased or decreased its basic research or scientific education expenditures in comparison with prior years.

For example, assume that the taxpayer's average in-house research expenditures in the base period are $1 million, and that in the current year the taxpayer again spends $1 million on in-house research wages and supplies plus $100,000 as a grant to a university for basic research and salary support in engineering. Under the bill, the taxpayer's qualifying current-year expenditures would be $1,065,000, and the credit would apply to the $65,000 excess over the base period average.

Assume in the second year that the taxpayer again spends $1 million on in-house research plus $80,000 on university basic research and faculty salary support, so that its qualified research expenditures for that year total $1,052,000. (The example assumes that the special limitation is not triggered.) The base period average would remain $1 million, since under the bill none of the university grants in the prior year would enter into the base period determination. Thus, the 25-percent credit would apply to $52,000 (i.e., 65 percent of the current-year expenditures for university basic research and faculty salary support).

Effective date

The provisions of section 3 of S. 1194 would apply to taxable years beginning after the date of enactment.

Explanation of Section 3, S. 1195

Expenditures for faculty wages and student loans

In general

Under section 3 of the bill, the category of corporate expenditures eligible for a 25 percent credit under Code section 44F would be expanded to include 65 percent of amounts paid or incurred[30] by a corporation[31] to a qualified educational organization, pursuant to written agreement, for scientific education uses. The latter term would mean the education of students or faculty in engineering or engineering technologies, the physical, biological, and computer sciences or technologies, mathematics, and electronic and automated medical, industrial, and agricultural equipment and instrumentation operation.

To qualify as scientific education expenditures, the amounts would have to be used by the educational institution for payment of wages to faculty employees who are directly engaged in providing scientific education, or for funding scholarships or loans for students at the institution who possess a bachelor's degree or its equivalent and who are engaged in postgraduate study in mathematics, computer science and applications, engineering, or the physical or biological sciences. In addition, amounts to be used for wages would have to be paid to the educational institution pursuant to a written agreement which obligates the taxpayer to render a like amount to the recipient for at least three consecutive years.

Eligible recipients for credit purposes

S. 1195 would define qualified organizations for certain section 44F purposes to mean—

(1) an educational organization (as described in section 170(b)(1)(A)(ii)[32] which is an institution of higher education (as defined in sec. 3304(f));[33]

(2) an area vocational education school (as defined in P.L. 94-482);[34]

(3) an organization which is organized primarily to conduct scientific research, which is described in section 501(c)(3), and which is not a private foundation; or

(4) an organization which is organized primarily to promote scientific research or scientific education by qualified organizations, which expends on a current basis substantially all its funds through grants and contracts for basic research or scientific education by a qualified organization, and which is described in either section 501(c)(3) or section 501(c)(6).

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[30] The bill would repeal the contract research prepayment rule of present law (see note 24, *supra*).

[31] See note 7, *supra*.

[32] See note 4, *supra*.

[33] See note 9, *supra*.

[34] See note 19, *supra*.

Exclusion of payments from base period determinations

Under S. 1195, corporate expenditures for either basic research or scientific education which were included in the section 44F credit computation in a prior taxable year would be excluded, in calculating incremental expenditures in the taxable year, from the amount of base period expenditures for that prior year. Thus, as long as the taxpayer did not decrease the amount of its other expenditures qualifying under section 44F, the 25 percent credit would apply to 65 percent of all the taxpayer's qualifying basic research and scientific education expenditures in the current year, whether the taxpayer had increased or decreased its basic research or scientific education expenditures in comparison with prior years.

For example, assume that the taxpayer's average in-house research expenditures in the base period are $1 million, and that in the current year the taxpayer again spends $1 million on in-house research wages and supplies plus $100,000 as a grant to a university for basic research and salary support in engineering. Under the bill, the taxpayer's qualifying current-year expenditures would be $1,065,000, and the credit would apply to the $65,000 excess over the base period average.

Assume in the second year that the taxpayer again spends $1 million on in-house research plus $80,000 on university basic research and faculty salary support, so that its qualified research expenditures for that year total $1,052,000. The base period average would remain $1 million, since under the bill none of the university grants in the prior year would enter into the base period determination. Thus, the 25-percent credit would apply to $52,000 (i.e., 65 percent of the current-year expenditures for university basic research and faculty salary support).

Effective date

The provisions of section 3 of S. 1195 would apply to taxable years beginning after the date of enactment.

c. *Tax Treatment of Payments and Loan Forgiveness Received by Certain Graduate Science Students*

Present Law

In general

Subject to several limitations, gross income does not include amounts received as a scholarship at an educational institution or as a fellowship grant (Code sec. 117). In general, a degree candidate may exclude the entire amount of the scholarship or fellowship grant, except for any portion which is regarded as payment for services in the nature of part-time employment. An individual who is not a candidate for a degree is limited to an exclusion of $300 per month for a period of 36 months.

Future services as compensation

In general, scholarships or fellowship grants are not excludable from gross income if they constitute compensation for past, present, or future employment services or for services subject to the direction or supervision of the grantor, or if the funded studies or research are primarily for the benefit of the grantor (Treas. Regs. sec. 1.117-4(c)). However, amounts received under Federal programs that are used for qualified tuition and related expenses are not disqualified from the exclusion merely because the recipient agrees to perform future services as a Federal employee or in a health manpower shortage area (sec. 117(c)).

In 1977, the Internal Revenue Service ruled that awards made under the provisions of the National Research Service Awards Act to individuals who, in return for receiving the awards, must subsequently engage in health research or teaching or some equivalent service (and must allow the government to make royalty-free use of any copyrighted materials produced as a result of the research) are not excludable as scholarships or fellowship grants (Rev. Rul. 77-319, 1977-2 C.B. 48). However, this ruling was overturned by the Revenue Act of 1978 for awards made during calendar years 1974-1979, and by subsequent legislation for awards made through 1983.

Income from debt cancellation

As a general rule, income is realized when indebtedness is forgiven or cancelled (sec. 61(a)(12)). In the case of discharge when the taxpayer is in bankruptcy or is insolvent or the discharge of qualified business indebtedness, the discharge amount instead may be applied to reduce tax attributes of the debtor (secs. 108, 1017).

The Tax Reform Act of 1976 provided a special income exclusion rule for cancellation of certain student loans. The exclusion under that rule applied to debt discharges (prior to 1979) pursuant to a loan agreement under which the indebtedness would be discharged if the individual worked for a period of time in specified professions in certain geographical areas or for certain classes of employers. This rule applied to student loans made to an individual to assist in attending an educational institution only if the loan was made by a government unit or agency. The rule was extended by the Revenue Act of 1978 to such discharges occurring through 1982.

Explanation of Section 4, S. 1194 and Section 4, S. 1195

In general

The bills would provide a new Code section under which gross income would not include amounts received by certain graduate science students as a scholarship, fellowship grant, or qualified student loan forgiveness. The exclusion generally also would extend to amounts received to cover expenses for travel, research, clerical help, or equipment incidental to the scholarship or fellowship grant, so long as such amounts are expended by the recipient, and to the value of contributed services and accommodations.

Qualified recipients

Under the bills, the new provision would apply to students having a bachelor's degree or its equivalent who are engaged in postgraduate study as a degree candidate in mathematics, engineering, the physical or biological sciences, or certain computer fields[35] at qualified educational organizations. The latter term would mean an educational institution that is described in section 170(b)(1)(A)(ii),[36] admits as regular students only individuals having a certificate of graduation from a high school (or the recognized equivalent of such certificate), is legally authorized to provide an educational program beyond high school, and provides an educational program for which it awards a bachelor's or higher degree.

Qualified student loan forgiveness would be defined as forgiveness of a loan received by such science students for the purpose of financing their postgraduate study in certain specified fields (but only to the extent that the loan was actually expended for such postgraduate study), where the student is required to perform teaching services for a qualified educational organization on completion of the postgraduate course of study, under the terms of a written loan agreement and as a condition of receiving loan forgiveness.

Limitations on exclusion

The exclusion from gross income under the bills would not extend to amounts received as payment for teaching, research, or other services as part-time employment required as a condition to receiving the scholarship, fellowship grant, or qualified student loan. However, teaching, research, or other services would not be regarded as part-time employment if such activities are required of all candidates (whether or not recipients of funds) for a particular degree as a condition to receiving the degree.

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[35] In S. 1194, computer science; in S. 1195, computer science and applications.

[36] See note 4, *supra*.

The bills provide that amounts otherwise qualifying for exclusion from gross income as a scholarship, fellowship grant, or qualified student loan forgiveness under the new Code section would not be includible in gross income merely because of a requirement for postgraduate performance of teaching services for a qualified educational organization. For this rule to apply, the recipient also must establish that the amount of the award or grant was used for qualified tuition and related expenses, under the terms of the scholarship, fellowship, or qualified student loan. Qualified tuition and related expenses would be defined as tuition and fees required for attendance and fees, books, supplies, and equipment required for courses at the educational institution.

Effective date

The Scholarship and loan forgiveness provisions of S. 1194 and of S. 1195 would apply to taxable years beginning after the date of enactment.

Senator DANFORTH. The hearing will come to order. Is Congressman Shannon here?

Congressman SHANNON. Yes.

Senator DANFORTH. Good morning. Thank you for being here.

STATEMENT OF HON. JAMES M. SHANNON, U.S. REPRESENTATIVE, STATE OF MASSACHUSETTS

Congressman SHANNON. Thank you very much for having me. My statement will be brief. I very much appreciate the opportunity to appear before you and discuss the legislation which you are considering today. All of these bills are good ones and I hope that the committee will give them favorable consideration. S. 1194 and S. 1195 are similar to legislation which I have introduced in the House. This legislation will further the progress we have started to make in getting educational institutions and private businesses together to upgrade the scientific and technical training offered to the students who will comprise our future work force.

S. 654 is another important bill. It would overturn the current Treasury regulation on 861 which requires that R&D expenses of corporations with foreign operations are allocated between domestic source income and foreign source income, regardless of where the expenses are actually incurred.

Implementation of this regulation has so far been halted by a congressional moratorium which will expire this year. We must not allow this regulation to go into effect. I believe that it would be a serious deterrent to domestic research and development expenses by companies with foreign operations.

As an original sponsor of the tax credit for incremental R&D expenditures, however, I would like to focus on S. 738, the Research Incentives Continuation Act of 1983, which would eliminate the 1985 sunset on this tax credit and make it permanent. In order to understand why the R&D tax credit is so important, it is helpful to take a look at the situation that existed before it was enacted. There was a growing realization that the continued health and competitiveness of the U.S. economy depended upon constant innovation and increases in productivity, and that for the past decade that had just not been occurring. Between 1968 and 1979, expenditures for R&D remained at a stable level in constant dollars, fluctuating between $19 billion and $23 billion. R&D expenditures as a percentage of the GNP, after increasing steadily up until the late 1960's, stagnated through the 1970's. Combined military and civilian R&D reached a high of almost 3 percent of GNP in 1968, then declined to less than 2.3 percent by 1977, and stayed at around that level. Civilian R&D steadily increased to 1.5 percent of GNP in 1968 and has remained at around that level ever since. Meanwhile, civilian R&D had grown to about 1.9 percent of GNP for Japan and 2.3 percent for West Germany. The consequence of this was a steady decline in U.S. productivity between 1969 and 1980.

Adding to this problem was the fact that we were in a period of high interest rates, discouraging all types of investment. This was especially true of R&D where the payoff from investment, if any, is not immediate and concrete but long-term and uncertain. And the ACRS provisions that were proposed and enacted in the same year did very little for the innovative high technology companies whose growth would be most important to the future of our economy because the actual depreciation lives of their principal assets were already as short as the shortest ACRS lives. This is the situation that the R&D tax credit was intended to address, and the situation that, to a great extent, continues to exist. One of the best features of the credit is that it is specifically designed to address this situation. The credit is only for increases in R&D spending; companies that simply maintain their current level of spending and don't try for real innovation will not be able to use it. Thus, if the incentive works as intended, we should see those R&D figures start to move off their plateau and start going up again.

It is a little early yet to be able to tell for sure whether the tax credit is having its intended effect. Tax returns for the years in which it has been in effect have only just begun to be analyzed. Regulations for this provision were only issued last January and are not yet final, creating an uncertaintv which may be deterring some companies from using the credit. However, the indications so far are encouraging.

Every year, the McGraw Hill Co. takes a survey of business plans for current and future research and development expenditures. This year's survey has just come out, and while it is not quite as optimistic as last year's projections, it still contains good news on the R&D front. During 1981, R&D expenditures by more than 300 firms surveyed by McGraw Hill increased by 16.5 percent. Last year R&D spending increased by 8.4 percent. This year it is projected to increase by 8.2 percent.

It is important to look at these figures in the light of the recent economic events. First of all, the boom in R&D spending that was getting underway in 1981 collided squarely with the recession. Also, the inflation rate has significantly declined, and spending projections have been adjusted downward to account for this. What is significant, however, is that these companies have still, even during a severe recession, continued to substantially increase their R&D spending. This runs directly counter to the usual trend during and shortly after a recession. Usually at such times, spending for both capital goods and R&D is cut back, with firms tending to eliminate expenditures that aren't tied to current operations. During this recession, however, firms were making increases in R&D at the same time that they were cutting capital spending. This trend was expected to continue during 1983. The report also found that the ratio of R&D to capital outlays was projected to keep rising through 1986.

The report also noted the possibility that R&D spending could actually rise faster than envisioned by current plans. This is because plans for upcoming years were made during the depths of the recession and might well change as the recovery proceeds. and also because it would be consistent with patterns in recent history.

The R&D tax credit cannot take all of the credit for this new trend, of course. The jump in R&D spending was getting underway even before it was passed. But I am convinced that it constituted an important additional stimulus.

I can see the results in the high technology firms in my own district, companies like Wang, Digital, and Data General. These companies are reporting significant increases in R&D spending, increases far beyond the dollar amount of the credit. These increases can be seen both in absolute dollars and as an increasing percentage of sales, at a time when sales themselves are also growing.

I have received testimony from one of these companies, M/A COM, Inc., a leading firm in the communications area, which I understand will be part of the written record of these hearings. I would urge the committee members to study this testimony carefully. It states specifically that the R&D credit has encouraged M/A COM and companies like it to undertake research and development efforts which they would not otherwise undertake. For this company, the credit during the 2 years it has been in existence "has become imbedded in the thinking" of the company's senior management and it "has had the effect of heightening the corporate priority for research."

I think that we should make sure that this trend continues. A short spurt of increased R&D spending, followed by another drop or plateau, is not going to keep the economy healthy in the long run. We need a permanent incentive. And the fact that a sunset was written into the R&D tax credit provisions does not mean that they were not supposed to be a permanent incentive. The purpose for the sunset was to give Congress a chance to see whether the credit actually worked and whether any of its provisions needed to be adjusted to make it work better. There may well be room to improve the credit by expanding the list of qualifying expenses, for example, and this is something we should look at a little further down the road. But for now, our first priority must be to recognize the fact that the credit is working and that we should make it permanent.

Why eliminate the sunset now? Why not wait until closer to 1985 when we can be more sure of exactly how the tax credit is working? For one very important reason: We must create a climate of certainty for the businesses that will be using the credit. Companies have already been grappling with a great deal of economic uncertainty as they try to plan their future expenditures. It is hard for them to plan their R&D expenditures when they can't even be sure what the tax consequences will be. The companies in my district tell me that their planning cycle for R&D runs about 3 to 5 years, with the heaviest expenditures occurring in the last years. This means that companies are already planning now for the expenditures that will fall beyond that sunset date. And given the possibility that the credit will not be extended beyond that date, many of these companies will inevitably decide against further increases in R&D spending. In fact, one reason why it does not make sense to wait for more data before extending the credit is that given this 3- to 5-year cycle, spending decisions may already be being affected by uncertainty over the sunset, making the effect of the credit appear to be less than it really is.

Another argument might be that we should wait and see what the economy looks like before extending the credit. We have all been worrying about what the deficit is going to look like in the out years, and there has been talk about making sure that taxes aren't cut any further during those years. The R&D tax credit is estimated to cost close to $1 billion a year, and I understand that a study by the National Science Foundation raises the possibility that the revenue loss will be greater. But whether the figure is $1 billion or $2 billion, I think that the benefits of the credit are well worth the price. This is a cost-effective measure. The returns to the economy in increased productivity, innovation, and competitiveness could far exceed the cost of providing the incentive. By contrast, the ACRS and leasing provisions, even after TEFRA, will cost us $16 billion this year and $29 billion in 1985, and the economic benefits have proven to be uncertain at best.

The R&D tax credit is a perfect example of how a good tax expenditure should work. It is specifically targeted. It is cost effective. It provides a clear signal of a Government policy on which there is a widespread consensus. But if it continues to be hampered by the sunset provision, it cannot, because of the resulting uncertainty, continue to work in the manner in which it was intended, and its beneficial effects may be only temporary. It is essential that we act now to keep this important provision in place as a permanent part of the tax code.

I want to thank you, Senator, for your leadership in this effort and say that I look forward to working with you, whether we have a big revenue bill this year or not, and seeing that the credit is improved and extended.

Senator DANFORTH. Thank you very much, Congressman Shannon. You have certainly been the leader in this area, and I think you have given us very powerful testimony, first of all, from your own knowledge of businesses in your district. Your belief, as I understand it, is that they have used the credit and it has been a positive incentive for research and development spending, and, but for the credit, it is unlikely that they would have done as much in R&D; and, second, your very strong position that the credit should be made permanent and not just a temporary extension.

We, I think, used to pass revenue bills about once every 7 years or so around here. Now we pass them every year. And one of the things that it does is remove any sense of certainty at all. Who knows how to plan anything if Congress is constantly fiddling around with the tax laws? It is my understanding of your view that this is the time for us to set out a long-term program, not just a short, 2- or 3-year extension, but something that businesses can really plan on.

Congressman **Shannon**. That's right.

Senator **Danforth**. And making their own programs, hiring personnel, all of the things that they have to do to have an effective research effort.

Congressman **Shannon**. That's right. I think that the great success in the economy in my area of the country has been a result of long-term planning and a willingness to look several years down the road and try to anticipate what products would be marketable several years down the road. And if we want to encourage that and want to see other industries do it, I think that we have got to really create some certainty about how much can be spent on R&D, and if we can make this credit permanent or extend it for a good period of time, I think that we really have a chance of assisting that recovery and, just as importantly, probably assisting the effort at getting the economy to make the transitions that are coming anyway and make them as smoothly as possible. That is why I think that what we do with the R&D credit this year is very important.

Senator **Danforth**. Thank you very much. Senator Heinz?

Senator **Heinz**. No comments.

Congressman **Shannon**. Thank you very much.

Senator **Danforth**. Thank you, Congressman Shannon.

Congressman **Zschau**.

[The prepared written statement of Congressman Shannon follows:]

STATEMENT OF
THE HONORABLE JAMES M. SHANNON
BEFORE THE
SENATE COMMITTEE ON FINANCE
MAY 27, 1983

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE, I VERY MUCH APPRECIATE THE OPPORTUNITY TO APPEAR BEFORE YOU AND DISCUSS THE LEGISLATION WHICH YOU ARE CONSIDERING TODAY. ALL OF THESE BILLS ARE GOOD ONES, AND I HOPE THAT THE COMMITTEE WILL GIVE THEM FAVORABLE CONSIDERATION. S. 1194 AND S. 1195 ARE SIMILAR TO LEGISLATION I HAVE INTRODUCED IN THE HOUSE. THIS LEGISLATION WILL FURTHER THE PROGRESS WE HAVE STARTED TO MAKE IN GETTING EDUCATIONAL INSTITUTIONS AND PRIVATE BUSINESSES TOGETHER TO UPGRADE THE SCIENTIFIC AND TECHNICAL TRAINING OFFERED TO THE STUDENTS WHO WILL COMPRISE OUR FUTURE WORKFORCE.

AS AN ORIGINAL COSPONSOR OF THE TAX CREDIT FOR INCREMENTAL RESEARCH AND DEVELOPMENT EXPENDITURES, HOWEVER, I WOULD LIKE TO FOCUS ON S. 738, THE RESEARCH INCENTIVES CONTINUATION ACT OF 1983, WHICH WOULD ELIMINATE THE 1985 SUNSET ON THIS TAX CREDIT AND MAKE IT PERMANENT. I CONSIDER THIS TO BE ONE OF THE MOST IMPORTANT PIECES OF LEGISLATION BEFORE CONGRESS THIS YEAR.

In order to understand why the R&D tax credit is so important, it is helpful to take a look at the situation that existed when it was enacted. There was a growing realization that the continued health and competitiveness of the U.S. economy depended on constant innovation and increases in productivity, and that for the past decade that had just not been occurring. Between 1968 and 1979, expenditures for research and development remained at a stable level in constant dollars, fluctuating between $19 billion and $22.8 billion. R&D expenditures as a percentage of the Gross National Product, after increasing steadily up until the late 1960's, stagnated through the 1970's. Combined military and civilian R&D reached a high of almost 3% of GNP in 1968, then declined to less than 2.3% by 1977 and stayed at around that level. Civilian R&D steadily increased to 1.5% of GNP in 1968, and has remained at around that level ever since. Meanwhile, civilian R&D had grown to about 1.9% of GNP for Japan and 2.3% for West Germany. The consequence of this was a steady decline in U.S. productivity between 1969 and 1980.

Adding to this problem was the fact that we were in a period of high interest rates, discouraging all types of investment. This was especially true of R&D, where the payoff from investment, if any, is not immediate and concrete but long-term and uncertain. And the ACRS provisions that were proposed and enacted in the same year did very little for the innovative high technology companies whose growth would be most important to the future of our economy, because the actual deppeciation lives of their principal assets were already as short as the shortest ACRS lives.

THIS IS THE SITUATION THAT THE R&D TAX CREDIT WAS INTENDED TO ADDRESS, AND THE SITUATION THAT, TO A GREAT EXTENT, CONTINUES TO EXIST. ONE OF THE BEST FEATURES OF THE CREDIT IS THAT IT IS SPECIFICALLY DESIGNED TO ADDRESS THIS SITUATION. THE CREDIT IS ONLY FOR INCREASES IN R&D SPENDING; COMPANIES THAT SIMPLY MAINTAIN THEIR CURRENT LEVEL OF SPENDING AND DON'T TRY FOR REAL INNOVATION WILL NOT BE ABLE TO UTILIZE IT. THUS, IF THE INCENTIVE WORKS AS INTENDED, WE SHOULD SEE THOSE R&D FIGURES START TO MOVE OFF THEIR PLATEAU AND START GOING UP AGAIN.

IT'S A LITTLE EARLY YET TO BE ABLE TO TELL FOR SURE WHETHER THE TAX CREDIT IS HAVING ITS INTENDED EFFECT. TAX RETURNS FOR THE YEARS IN WHICH IT HAS BEEN IN EFFECT HAVE ONLY JUST BEGUN TO BE ANALYZED. REGULATIONS FOR THIS PROVISION WERE ONLY ISSUED LAST JANUARY AND ARE NOT YET FINAL, CREATING AN UNCERTAINTY WHICH MAY BE DETERRING SOME COMPANIES FROM USING THE CREDIT. HOWEVER, THE INDICATIONS SO FAR ARE ENCOURAGING.

EVERY YEAR, THE MCGRAW HILL COMPANY TAKES A SURVEY OF BUSINESS' PLANS FOR CURRENT AND FUTURE RESEARCH AND DEVELOPMENT EXPENDITURES. THIS YEAR'S SURVEY HAS JUST COME OUT, AND WHILE IT IS NOT QUITE AS OPTIMISTIC AS LAST YEAR'S PROJECTIONS, IT STILL CONTAINS GOOD NEWS ON THE R&D FRONT. DURING 1981 R&D EXPENDITURES BY THE MORE THAN 300 FIRMS SURVEYED BY MCGRAW-HILL INCREASED BY 16.5%. LAST YEAR R&D SPENDING INCREASED BY 8.4%; THIS YEAR IT IS PROJECTED TO INCREASE BY 8.2%.

IT IS IMPORTANT TO LOOK AT THESE FIGURES IN LIGHT OF RECENT ECONOMIC EVENTS. FIRST OF ALL, THE BOOM IN R&D SPENDING THAT WAS GETTING UNDERWAY

IN 1981 COLLIDED SQUARELY WITH THE RECESSION. ALSO, THE INFLATION RATE HAS SIGNIFICANTLY DECLINED, AND SPENDING PROJECTIONS HAVE BEEN ADJUSTED DOWNWARD TO ACCOUNT FOR THIS. WHAT'S SIGNIFICANT, HOWEVER, IS THAT THESE COMPANIES HAVE STILL, EVEN DURING A SEVERE RECESSION, CONTINUED TO SUBSTANTIALLY INCREASE THEIR R&D SPENDING. THIS RUNS DIRECTLY COUNTER TO THE USUAL TREND DURING AND SHORTLY AFTER A RECESSION. USUALLY AT SUCH TIMES, SPENDING FOR BOTH CAPITAL GOODS AND R&D IS CUT BACK, WITH FIRMS TENDING TO ELIMINATE EXPENDITURES THAT AREN'T TIED TO CURRENT OPERATIONS. DURING THIS RECESSION HOWEVER, FIRMS WERE MAKING INCREASES IN R&D AT THE SAME TIME THAT THEY WERE CUTTING CAPITAL SPENDING. THIS TREND WAS EXPECTED TO CONTINUE DURING 1983. THE REPORT ALSO FOUND THAT THE RATIO OF R&D TO CAPITAL OUTLAYS WAS PROJECTED TO KEEP RISING THROUGH 1986.

THE REPORT ALSO NOTED THE POSSIBILITY THAT R&D SPENDING COULD ACTUALLY RISE FASTER THAN ENVISIONED BY CURRENT PLANS. THIS IS BECAUSE PLANS FOR UPCOMING YEARS WERE MADE DURING THE DEPTHS OF THE RECESSION AND MIGHT WELL CHANGE AS THE RECOVERY PROCEEDS, AND ALSO BECAUSE IT WOULD BE CONSISTENT WITH PATTERNS IN RECENT HISTORY.

THE R&D TAX CREDIT CANNOT TAKE ALL OF THE CREDIT FOR THIS NEW TREND, OF COURSE. THE JUMP IN R&D SPENDING WAS GETTING UNDERWAY EVEN BEFORE IT WAS PASSED. BUT I AM CONVINCED THAT IT CONSTITUTED AN IMPORTANT ADDITIONAL STIMULUS.

I CAN SEE THE RESULTS IN THE HIGH TECHNOLOGY FIRMS IN MY OWN DISTRICT, COMPANIES LIKE WANG, DIGITAL, AND DATA GENERAL. THESE COMPANIES ARE REPORTING SIGNIFICANT INCREASES IN R&D SPENDING, INCREASES FAR BEYOND THE DOLLAR AMOUNT OF THE CREDIT. THESE INCREASES CAN BE SEEN BOTH IN ABSOLUTE DOLLARS AND AS AN INCREASING PERCENTAGE OF SALES--AT A TIME WHEN SALES THEMSELVES ARE ALSO

GROWING.

I HAVE RECEIVED TESTIMONY FROM ONE OF THESE COMPANIES, M/A COM, INC., A LEADING FIRM IN THE COMMUNICATIONS AREA, WHICH I UNDERSTAND WILL BE PART OF THE WRITTEN RECORD OF THESE HEARINGS. I WOULD URGE THE COMMITTEE MEMBERS TO STUDY THIS TESTIMONY CAREFULLY. IT STATES SPECIFICALLY THAT THE R&D TAX CREDIT HAS ENCOURAGED M/A COM AND COMPANIES LIKE IT TO UNDERTAKE RESEARCH AND DEVELOPMENT EFFORTS WHICH THEY WOULD NOT OTHERWISE UNDERTAKE. FOR THIS COMPANY, THE CREDIT, DURING THE TWO YEARS IT HAS BEEN IN EXISTENCE, "HAS BECOME IMBEDDED IN THE THINKING" OF THE COMPANY'S SENIOR MANAGEMENT AND "HAS HAD THE EFFECT OF HEIGHTENING THE CORPORATE PRIORITY FOR RESEARCH."

I THINK WE SHOULD MAKE SURE THAT THIS TREND CONTINUES. A SHORT SPURT OF INCREASED R&D SPENDING, FOLLOWED BY ANOTHER DROP OR PLATEAU, IS NOT GOING TO KEEP THE ECONOMY HEALTHY IN THE LONG RUN. WE NEED A PERMANENT INCENTIVE. AND THE FACT THAT A SUNSET WAS WRITTEN INTO THE R&D TAX CREDIT PROVISIONS DOES NOT MEAN THAT THEY WERE NOT SUPPOSED TO BE A PERMANENT INCENTIVE. THE PURPOSE FOR THE SUNSET WAS TO GIVE CONGRESS A CHANCE TO SEE WHETHER THE TAX CREDIT ACTUALLY WORKED, AND WHETHER ANY OF ITS PROVISIONS NEEDED TO BE ADJUSTED TO MAKE IT WORK BETTER. THERE MAY WELL BE ROOM TO IMPROVE THE CREDIT, BY EXPANDING THE LIST OF QUALIFYING EXPENSES, FOR EXAMPLE; AND THIS IS SOMETHING WE SHOULD LOOK AT A LITTLE FURTHER DOWN THE ROAD. BUT FOR NOW OUR FIRST PRIORITY MUST BE TO RECOGNIZE THE FACT THAT THE CREDIT IS WORKING AND THAT WE SHOULD MAKE IT PERMANENT.

WHY ELIMINATE THE SUNSET NOW? WHY NOT WAIT UNTIL CLOSER TO 1985, WHEN WE CAN BE MORE SURE OF EXACTLY HOW THE TAX CREDIT IS WORKING? FOR ONE VERY

IMPORTANT REASON: WE MUST CREATE A CLIMATE OF CERTAINTY FOR THE BUSINESSES THAT WILL BE USING THIS CREDIT. COMPANIES HAVE ALREADY BEEN GRAPPLING WITH A GREAT DEAL OF ECONOMIC UNCERTAINTY AS THEY TRY TO PLAN THEIR FUTURE EXPENDITURES. IT IS HARD FOR THEM TO PLAN THEIR R&D EXPENDITURES WHEN THEY CAN'T EVEN BE SURE WHAT THE TAX CONSEQUENCES WILL BE. THE COMPANIES IN MY DISTRICT TELL ME THAT THE PLANNING CYCLE FOR RESEARCH AND DEVELOPMENT RUNS ABOUT THREE TO FIVE YEARS, WITH THE HEAVIEST EXPENDITURES OCCURRING IN THE LAST YEARS. THIS MEANS THAT COMPANIES ARE ALREADY PLANNING NOW FOR EXPENDITURES THAT WILL FALL BEYOND THE SUNSET DATE. AND, GIVEN THE POSSIBILITY THAT THE TAX CREDIT WILL NOT BE EXTENDED BEYOND THAT DATE, MANY OF THESE COMPANIES WILL INEVITABLY DECIDE AGAINST FURTHER INCREASES IN R&D SPENDING. IN FACT, ONE REASON WHY IT DOES NOT MAKE SENSE TO WAIT FOR MORE DATA BEFORE EXTENDING THE CREDIT IS THAT GIVEN THIS THREE-TO-FIVE YEAR CYCLE, SPENDING DECISIONS MAY ALREADY BE BEING AFFECTED BY UNCERTAINTY OVER THE SUNSET, MAKING THE EFFECT OF THE CREDIT APPEAR TO BE LESS THAN IT REALLY IS.

ANOTHER ARGUMENT MIGHT BE THAT WE SHOULD WAIT AND SEE WHAT THE ECONOMY LOOKS LIKE BEFORE EXTENDING THE CREDIT. WE'VE ALL BEEN WORRYING ABOUT WHAT THE DEFICIT IS GOING TO LOOK LIKE IN THE "OUT YEARS," AND THERE HAS BEEN TALK ABOUT MAKING SURE THAT TAXES AREN'T CUT ANY FURTHER DURING THOSE YEARS. THE R&D TAX CREDIT IS ESTIMATED TO COST CLOSE TO A BILLION A YEAR, AND I UNDERSTAND THAT A STUDY BY THE NATIONAL SCIENCE FOUNDATION RAISES THE POSSIBILITY THAT THE REVENUE LOSS WILL BE ABOUT TWICE THE JOINT TAX COMMITTEE ESTIMATES. BUT WHETHER THE FIGURE IS ONE BILLION OR TWO BILLION, I THINK THAT THE BENEFITS OF THE CREDIT ARE WELL WORTH THE PRICE. THIS IS A COST-EFFECTIVE MEASURE. THE RETURNS TO TNE ECONOMY IN INCREASED PRODUCTIVITY, INNOVATION, AND COMPETITIVENESS COULD FAR EXCEED THE COST OF PROVIDING THE INCENTIVE. BY CONTRAST, THE ACRS

AND LEASING PROVISIONS, EVEN AFTER TEFRA, WILL COST US $16 BILLION THIS YEAR AND $29 BILLION BY 1985, AND THE ECONOMIC BENEFITS HAVE PROVEN TO BE UNCERTAIN AT BEST.

THE R&D TAX CREDIT IS A PERFECT EXAMPLE OF HOW A GOOD TAX EXPENDITURE SHOULD WORK. IT'S SPECIFICALLY TARGETED. IT IS COST EFFECTIVE. IT PROVIDES A CLEAR SIGNAL OF A GOVERNMENT POLICY ON WHICH THERE IS A WIDESPREAD CONSENSUS. BUT IF IT CONTINUES TO BE HAMPERED BY THE SUNSET PROVISION, IT CANNOT, BECAUSE OF THE RESULTING UNCERTAINTY, CONTINUE TO WORK IN THE MANNER IN WHICH IT WAS INTENDED; AND ITS BENEFICIAL EFFECTS MAY BE ONLY TEMPORARY. IT IS ESSENTIAL THAT WE ACT NOW TO KEEP THIS IMPORTANT PROVISION IN PLACE AS A PERMANENT PART OF THE TAX CODE.

W/ SHANNON

STATEMENT OF
JOHN R. COLBERT
Treasurer of M/A-COM, Inc.
on
S.738
The Research Incentives Continuation Act of 1983
Before the
Subcommittee on Taxation and Debt Management
of the
Senate Committee on Finance
May 27, 1983

- Expanding research & development is important to the future of the United States and to M/A-COM; without R&D, industrial units rapidly become non-competitive.
- M/A-COM R&D is directly responsible for our company's leadership and success by producing new products and processes in the telecommunications, defense and health fields.
- The R&D tax credit has, by itself, stimulated us to make a greater financial commitment to R&D than we otherwise would have, which we expect will make us more competitive in international as well as domestic markets.
- Refusal to make the credit permanent would tell corporate management that R&D is no longer a national priority; this would be the wrong signal to send.

M/A-COM, Inc., South Avenue, Burlington, MA 01803, (617) 272-9600

Mr. Chairman, I am John R. Colbert, Treasurer of M/A-COM, Inc. I am pleased to have the opportunity to present M/A-COM's views in support of extending the tax credit for increasing research and development expenditures. I have been assisted in preparing this statement by Dr. Joseph Saloom, a Senior Vice President of M/A-COM and Deputy Director of our Components Technology Center, and Mr. Stephen Zezima, our Corporate Tax Manager. Dr. Saloom is one of the administrators of our corporate R&D activities.

M/A-COM was founded in 1950 as Microwave Associates, Inc. and adopted its present name in 1978 to reflect the company's diversification. We have evolved from a company that chiefly sold microwave products to the military into a designer and manufacturer of equipment and systems for use in satellite communications, data communications, television broadcasting and cable television (CATV). M/A-COM is the nation's largest supplier of coaxial cable for the CATV industry and a major designer and manufacturer of numerous digital communications products as well as microwave semiconductors, components and subsystems and other products for commercial and defense applications.

Fiscal 1982 was a record year for M/A-COM, with sales reaching $587 million. However, because of the worldwide recession, profits were down and earnings per share fell 4% from the previous year. In spite of flat profits, we substantially increased research and development expenditures in 1982. I want to discuss this in more detail in a moment.

M/A-COM is a leader in high technology industry in the United States. In the digital communications area, our products include sophisticated modems used to increase the capacity, reliability and security of satellite communications systems; a line of digital processors used for multiplexing data streams into packets for efficient transmission; satellite communications terminals for real time data transmission for business communications; and microwave data transceivers for local distribution of data. We have developed satellite communications systems for the Department of Defense, and we are the largest supplier of digital Time Division Multiple Access (TDMA) satellite terminals for commercial satellite communications networks.

In the microwave components area, M/A-COM manufactures a broad line of products that generate, control and receive microwave energy. These products incorporate microwave semiconductor technology and are sold to manufacturers and users of military radar, missile guidance systems, electronic countermeasures equipment, and navigation systems. Some of the specific products include PIN diodes, used to control the passage of electrical energy through circuits; Schottky-barrier and point contact diodes, used to receive and detect microwave signals; Gunn diodes, used to generate low levels of microwave power; and microwave transistors, used to amplify microwave signals. M/A-COM now has in place the technology base to manufacture the underlying materials--silicon, gallium arsenide and ferrites--used for microwave components, as well as the ability to manufacture circuits, assemblies and subsystems for commercial and defense products. The experience gained from the recent conflicts in the Falkland Islands and the Middle East suggests increasing emphasis on the development of microwave components needed to drive complex electronic warfare systems. On the commercial side, the lighter weight and increased reliability of systems based on microwave semiconductor technology, such as portable microwave transmission systems for electronic newsgathering, assures continued growth and competition.

We at M/A-COM were greatly heartened by the recognition of the importance of industrial research and development displayed by members of this committee in enacting the R&D tax credit as part of the Economic Recovery Tax Act of 1981, and we have sought to do our part in continuing the American tradition of industrial growth. As a "high technology" manufacturing company, we are acutely sensitive to the continuing need to grow; research and development provides the fertile soil which companies like ours must have in order to prosper.

We view our own research and development program as the vital element which enables us to maintain the place of leadership we have earned in our own industry. In the fast-growing, highly competitive telecommunications industry the company with an old product line quickly becomes the company you used to hear about, but don't any more. For an example, TV news coverage used to depend upon a person at the scene who made some sort of recording, which was then transported back to the TV station, then broadcast to the public. Initially, that camera was bulky and heavy, and the film had to be carried away and processed. Today, using technology created by M/A-COM research, easily transportable microwave links and lightweight minicams relay pictures instantaneously to the broadcast station and "live" into the homes of the American public. Now, when Reggie Jackson hits a home run, a new President is inaugurated, or this committee makes the R&D tax credit permanent, we can all see it live as it happens. No more need to wait for "film at 11."

M/A-COM research has application in many facets of American life. For example, microwave sensor technology which was developed for the space program has been applied by our scientists to medicine, resulting in a device which is able to detect both existing and incipient cancer tumors in the human body by sensing a heat differential unique to a tumor. This device is currently being tested in several medical institutions around the country. If it fulfills its promise, it will provide every physician and health facility with affordable access to a reliable means of cancer diagnosis, enabling early treatment of victims. Another device, also in the same testing stage and using similar microwave technology, will allow the treatment of tumors with a heating process, eliminating in many cases the need for surgery. The potential for life-saving represented by these two devices is enormous.

These are but a few examples of the results of our intense R&D effort. Without going into detail, other such products of our most recent research include encryption technology for voice and data, which has both national security and commercial applications; video scrambling equipment for secure satellite distribution of video programming; coaxial cable for information transmission with increased capacity and improved installation capabilities; and satellite telecommunications technology which enables a widely diverse group of people to share a limited transmission capacity whenever they wish, thereby bringing the cost of these services within reach of a vast number of users.

Mr. Chairman, we appreciate that the question before the committee is: "Does the R&D tax credit work? Does it encourage companies to undertake research and development efforts which it would not otherwise undertake?" The answer from M/A-COM is a resounding "Yes!!"

The credit has been in effect for only two years; yet in that time it has become embedded in the thinking of our company's senior management, and has had the effect of heightening the corporate priority for research. Of course, M/A-COM will perform research and development activities regardless of the presence or absence of the credit, but that is not the question. What has happened is that a "tilt" has been created in favor of expanding our effort at a more rapid rate, just as you intended when you enacted the credit. It is too soon yet, and in fact may never be possible to draw a direct correlation between the dollars we recovered through the credit and the additional dollars we spent on R&D. I can, however, offer some specific observations on particular M/A-COM R&D efforts which were affected by the credit.

Since the credit was enacted, M/A-COM has made the decision to intensify its research in gallium arsenide (GaAs), a material which could be used with or in place of silicon in semiconductor components. Within the last year, we have made the commitment to acquire a $20 million facility to house this research and the manufacturing that results, and we will, of course, equip and populate it to the tune of many millions more. The presence of the credit made it much easier for us to commit to this level of effort, even though it represents an outlay far in excess of any we could expect to recover from the credit for years to come.

This program illustrates the effect of the credit on our corporate thinking; it also represents the difficulty of making a direct correlation between the credit and a given effort. Our GaAs effort is a long-term program. Decisions we make today will influence our company for decades to come. With that in mind, it is obvious that no such decision is made solely on the basis of the credit. On the other hand, this investment represents a major risk of assets for us. The willingness of the government to recognize that risk through the credit is no small factor in our willingness to undertake it.

There is one other thing I should mention about GaAs. It represents one of the technological areas in which the United States does not enjoy clear technological superiority over our trading partners, including Japan. Perhaps the safe play for us would be to stay in an area where we already have the head start. By participating vigorously in an area of international technological competition in which the outcome is not assured, we multiply our risk. We believe that this is precisely what you wanted us to do when you enacted the credit, and we are doing it.

There are other fields in which the United States does not possess clear technological superiority and in which we are also pursuing research, such as digital satellite telecommunications. From M/A-COM's perspective, this is very important to our corporate growth. Because we are competing vigorously in the international market and selling this equipment in other countries, we are benefiting U.S. trade balances. Digital satellite equipment requires sophisticated R&D, and we are committing our funds more readily than we might have done in the absence of the tax credit.

I have spoken at some length of the impact on our corporate thinking that the credit has provided. Let me give you a few figures to illustrate what it has meant to us financially. In fiscal year 1982, based on total sales of $587 million, we had about $15 million of tax-qualified R&D. In 1981 we had about $8.3 million in tax-qualified R&D, and in 1980 we had about $5.7 million. This gave us a tax credit for 1982 of about $1.6 million. Now, I should qualify these numbers as being approximate; we haven't yet filed our fiscal 1982 tax return. In addition, there is a substantial difference between tax-qualified R&D and the R&D calculated according to financial accounting principles; I will return to this point in a moment.

The $1.6 million tax credit is not a massive sum of money for a company with sales of $587 million. From a profitability standpoint, however, we consider it to be significant--nearly 4% of our profits of $41 million, or about 4 cents per share of common stock. Moreover, it is a sign to our management team that the policymakers in Washington do care about stimulating technological development. To us, it is significant that the tax credit has created an atmosphere that is favorable to R&D; in the long run, this is more important than the specific dollar effects.

I would like to address briefly a problem we have encountered in implementing the credit. Our financial people have been uncertain as to the precise value of the credit to our company because the Department of the Treasury, rather than accept the Financial Accounting Standards Board definition of R&D, has chosen to create a new definition of its own for tax purposes. While we understand and are sympathetic to Treasury's concerns that the credit not be abused, it is our feeling that we are liable to a long series of audit disputes and uncertainty before this "new" definition is fully understood. The difficulties are not so great for us that we are not using the credit; however, I suspect that a number of smaller companies, who do not have our expertise, will experience proportionately greater difficulty. Indeed, because of the increased risk of IRS dispute, some smaller companies may choose the conservative approach and not make full use of the credit.

Mr. Chairman, my point up to now has been to demonstrate that the R&D tax credit has been doing exactly what Congress wanted it to do; it is stimulating manufacturing companies like M/A-COM to redouble our research and development efforts. Our message to you is simple: in order to retain and enhance this atmosphere that encourages corporate R&D, we suggest that you make the credit a permanent part of the tax code.

Research and development activities are long term projects and can best prosper in an environment of long term stability. Our gallium arsenide research, which I discussed above, is a long term effort. Virtually all of our R&D programs are of the same nature; long term commitments of corporate resources to ventures with uncertain futures. The R&D tax credit is due to expire in less than three years, which makes long term planning difficult.

If the R&D tax credit is allowed to expire, the positive influence that has developed will evaporate and we are afraid that a negative environment will develop. Top corporate executives will perceive that the Federal Government made a conscious decision to take away a useful incentive in spite of its demonstrated value. The result could be a decreasing rate of R&D expenditures that would be contrary to the best interests of U.S. industrial policy and national security.

It is far too soon to quantify the full effect of the credit. The incentive was enacted in 1981 but the implementing regulations were not issued for 17 months after enactment. It is not possible to quantify the cost/benefit relationship at this point in time, and it may never be possible to do so. It is surely not possible to use the data from 1982 tax returns to argue that the cost (in lost revenue) outweighs the public benefits. To the contrary, we believe that the public policy benefits of the tax credit outweigh the revenue costs.

In sum, Mr. Chairman, we believe that the R&D tax credit is an invitation from the Federal government to companies like ours to reinvest our revenues in America's industrial future through research and development. We have accepted that invitation, and ask only that you continue it by enacting S.738.

STATEMENT OF HON. ED ZSCHAU, U.S. REPRESENTATIVE, STATE OF CALIFORNIA

Congressman **Zschau**. Good morning, Mr. Chairman, Senator Heinz. I appreciate the opportunity to appear before this distinguished subcommittee to talk about my views on the proper role for the Federal Government in promoting high technology and to comment specifically, on Senate bills S. 738, S. 1194, and S. 1195.

I have prepared a statement that I would like to submit for the record. Also, I brought with me a statement from my colleague from Pennsylvania, Congressman Don Ritter, who serves as vice chairman of the Republican Task Force on High Technology Initiatives, which I have the privilege of chairing. I would like permission to submit both statements for the record.

Senator **Danforth**. They will be made a part of the record. Thank you.

[The prepared statements of Congressmen Zschau and Ritter follow:]

TESTIMONY OF
CONGRESSMAN ED ZSCHAU

regarding

S. 738, S.1194, S.1195, and

"Proper Government Policy to Promote High Technology"

Mr. Chairman, I appreciate the opportunity to appear before this distinguished subcommittee to present my views about proper government policy to promote high technology. This issue is particularly important to me since I represent the part of Northern California that has become known worldwide as Silicon Valley. There are more than 700 high technology companies, many of them small, start-up firms, in and around my congressional district.

On January 25, 1983 President Ronald Reagan in his State of the Union message announced that "This Administration is committed to keeping America the technological leader of the world now and into the 21st century." These were welcome words indeed to those of us who have long believed that American technological leadership is perhaps our most valuable national resource.

American Technology's Achievements and Challenges

Over that past several years, a variety of studies have documented the importance of technological innovation on our economic growth, productivity, job opportunities, and trade competitiveness. A study by the Massachusetts Institute of Technology estimated that 80 percent of the growth in GNP of the United States between 1909 and 1949 was due to technical change. Further, a recent Brookings Institution study determined that more than one-half of the productivity increases in the United States between 1948 and 1969 were the direct result of technological innovation. In recent years, while the overall export performance of the United States has been mediocre, exports of research and development-intensive products have shown excellent growth. From 1960 to 1979, these industries increased their export surplus from $5.9 billion to $29.3 billion. During the same period, the trade balance of industries without technological bases declined from near zero to a negative $16.5 billion. It is clear that our technological leadership in the past has enabled the United States to create many new jobs to employ our growing work force.

The President's commitment to spur technology may have come just in the nick of time. Despite its importance to our economy, U.S. technological leadership has eroded in recent years. It hasn't been squandered like some other resources through overuse and waste. It's been frittered away through neglect.

Over the past 20 years, research-and-development expenditures as a percent of GNP have declined in the United States. During the same period, our two most aggressive trading partners -- Japan and West Germany -- were incresing these expenditures.

With the decreasing intensity of our research efforts, it is not surprising that our leadership in technical contributions has fallen as well. In the 1950's, the United States was credited with 80 percent of the major inventions made during that period. During the 1970's, our share of major inventions dropped to 60 percent. In addition, from 1974 to 1979, the U.S. patents granted to U.S. citizens rather than to foreign inventors dropped from 86 percent to 62 percent.

Government's Alternative Approaches to High Technology

Due to the outstanding performance of America's high technology industries in job creation, productivity improvements, and exports, plus the recognition that our leadership in technology is being challenged by foreign competitors, high technology has recently begun to receive considerable attention in the United States Congress. In the first months of 1983, more than one hundred bills have been introduced to promote high technology.

It is reassuring that a resource so valuable is finally getting proper attention, but all this attention may be a mixed blessing. Some of those who have jumped on the high technology bandwagon appear to be exaggerating its capabilities for restoring our economic growth. They suggest that high technology can create enough jobs to replace all those that are being lost in our so-called "smokestack" industries. They argue we should redirect our resources towards technology and give up on the "tired old industries" that have formed our industrial base in the past. Although such predictions sound plausible, the numbers don't add up, at least in the short term. High technology alone cannot create enough new jobs. We must not abandon our more mature industries. Instead we must make them more competitive. High technology should play a role in refurbishing our "smokestack" industries as well as spuring economic growth by creating new ones.

In our enthusiasm to help high technology, we must also avoid the temptation of legislating direct government involvement into technology and industry development. For example, it has been suggested that we should have some sort of Technology Planning Board which would identify those technologies and industries that have the most promise and subsidize them. I believe such a scheme would be doomed to failure. Government commissions are not the best groups to distinguish between opportunities and deadends. Those decisions are difficult even for those experienced investors or managers who are on the firing line and who have much to gain or lose personally. Even the most successful venture capital investors say that they expect only one or two real successes out of every ten investments. Government planning is not the answer.

Rather than "targeting" specific technologies or industries, the proper role for government is to target the process by which they are developed -- the process of innovation. That is, our government should focus on creating an environment in this country in which high technology, innovation, new ideas, and new companies are likely to flourish. Ensuring that such an environment exists is the best way to help America maintain its techological leadership.

In order to know exactly how to maintain an environment for innovation, it is necessary first to understand the process by which technological advances occur. It is not a well-defined, step-by-step process such as in an algorithm or computer program. However, studying examples of innovation, new technologies, and emerging companies helps to identify certain fundamentals that are necessary for the process of innovation to flourish.

The Process of Technological Innovation

In my congressional district near San Jose, California, this process of technological innovation has flourished over the past three decades in a fashion that has brought fame and fortune to the area. Companies in the area have contributed enormously to the development of telecommunications, integrated circuits, lasers, computer equipment, pharmaceuticals, and genetic engineering. A study of the many examples of entrepreneurship and innovation that have occurred there highlights the factors so important to the expansion of our technological and industrial base.

An environment that promotes technological innovation includes:

o A strong commitment to basic research, deepening and broadening our understanding of the fundamental processes that will form the basis for industries and products in the future;

o Incentives for investors, entrepreneurs, innovators and corporations to provide the capital and take the personal risks associated with the development of new companies and new products;

o A strong educational capability, particularly in the sciences, that assures an ample quantity of trained technical and management personnel and a broad base of technically literate citizens who can deal with the challenges of a high technology world;

o Expanding market opportunities, domestic and foreign, which require a healthy economic environment and aggressive trade policies.

A proper high technology industrial policy is one that focuses on all of these prerequisites for innovation. It should consist of specific legislative and regulatory initiatives that foster these conditions. In addition, it would mandate examining all existing or proposed legislation and regulations to make sure they would not have negative effects on the environment for innovation.

Today, this subcommittee is gathering information about three bills which directly affect two of these prerequisites: S.738, to make the R&D tax credit permanent, and strengthens and incentive for corporate risk-taking, and S.1194 and S.1195, which would increase the supply of trained technical personnel in this country. I strongly support the objectives and approaches of these measures.

IMPROVING THE R&D TAX CREDIT AND MAKING IT PERMANENT

The Economic Recovery Tax Act of 1981 contained a new incentive for corporate risk-taking to advance technology and innovation. It provided for a 25 percent tax credit on increases in research and development expenditures. This tax credit was an excellent idea, and it appears already to have had a positive effect on R&D expenditures. Although the R&D credit was only partially phased in in 1981 and 1982, the McGraw-Hill annual research and development survey shows that despite the severe recession there was a significant increase in research and development expenditures during these years, making this the first post-war recession in which the pace of research spending increased.

Although the tax credit can't be called the sole cause of the R&D increase, I believe it played an important role.

Although the R&D tax credit can be an important incentive, the restrictions that were placed on it in the ERTA of 1981 have, in my opinion, prevented it from being as effective as it should be. Most importantly, the tax credit is only temporary. It expires in 1986. However, since most R&D projects are long term in nature, a temporary R&D tax credit cannot provide the kind of incentive needed for long range projects.

By making the R&D tax credit permanent now, S.738 would enable companies planning their research and development programs today to assess the risk and returns from such activities knowing that the tax credit will be available throughout the life of the project. This should stimulate greater R&D for the long run. Happily, removing the sunset provision now will have no effect on tax revenues for the next two fiscal years, but it would have an immediate effect on R&D plans.

In addition to making the R&D tax credit permanent, there are some other improvements that should be made to make it more effective. For example, the R&D tax credit is applicable only to increases in the R&D expenditures of less than 100 percent per year. Increases in R&D above that growth rate are not eligible for the tax credit. Clearly, such a restriction does not affect most companies, particularly the largest companies. However, it's not unusual for a small company to increase its R&D spending at a rate much faster than 100 percent, at least for the first few years of its existence. These small companies have generally been the innovators in our economy, yet it is these very companies that under the current law are not able to take full advantage of the tax credit incentive. I'm hopeful that at some time in the near future the entire R&D tax credit will be reviewed and improvements will be made to make it more effective.

PROVIDING AN ADEQUATE SUPPLY OF TRAINED TECHNICAL PERSONNEL

We must insure that there is an adequate supply of trained technical people. This is a critical problem that has only recently been recognized. The future demand for engineers and technicians is predicted to far outstrip the supply. For example, a 1983 American Electronics Association survey has forecast an annual shortfall of 16,000 electrical engineers and computer scientists through 1987.

The scarcity of trained technical people will put us at a severe competitive disadvantage in world markets. Japan, for example, is training on a per capita basis twice as many engineers per year as we are.

The problem is a financial one. The cost of educating technical people, particularly engineers, is very high, and it's difficult to attract enough qualified professors because industrial salaries are so attractive. Currently, there are more than 2,000 unfilled faculty positions in the engineering departments of colleges and universities in America.

I believe private industry has an important role to play in providing the funding for increased technical education programs. The American Electronics Association and the Massachusetts High Technology Council, for example, have already established industrial giving programs to collect money from corporations and use it to fund faculty salaries and equipment.

The federal government has a role to play too. By offering tax credits for corporate contributions to colleges and universities for teaching activities, as well as research, we can encourage private sector support to increase the capacity of our technical education facilities without requiring a new federal bureaucracy to carry it out. I believe that S. 1194 and 1195 will provide the proper kinds of incentives to increase the funding of our technical education facilities.

As an important aside, we should also make sure that our immigration policy recognizes our need for trained technical people. In particular, since a high percentage of engineering students are foreign nationals, such students who develop technical skills in this country should be permitted to remain here. I'm hopeful that the immigration reform legislation currently making its way through Congress should recognize this need, rather than requiring such students to return to their home countries after receiving their education here.

High technology is perhaps our most valuable national resource. We must preserve it. However, changes in our rate of technological innovation will come slowly. Innovation can't be forced, it can only be fostered. It is fostered by creating an environment that emphasizes freedom of scientific and industrial activities and that offers incentives to the innovators, entrepreneurs and investors who have the talent and resources to advance technology. It is fostered by a strong base of fundamental technology and by a population that is well educated in science and its application. Finally, it is fostered in a healthy economic environment and by trade policies that provide expanding opportunities for our technological products. Promoting such an environment should be the primary objective of America's industrial policies. The swift enactment of S. 738, S. 1194, S. 1195 and their counterparts in the House would be important steps in the direction of fostering technological innovation and maintaining America's leadership in high technology.

STATEMENT OF CONGRESSMAN DON RITTER
BEFORE THE SENATE FINANCE COMMITTEE
MAY 27, 1983

MR. CHAIRMAN,

IT IS AN HONOR TO SUBMIT TESTIMONY ON THE MERITS OF S.738 INTRODUCED BY ME ESTEEMED COLLEAGUE FROM THE SENATE, MR. DANFORTH. I WOULD LIKE TO COMMEND THE CHAIRMAN FOR HOLDING THESE HEARINGS AND FOR THE OPPORTUNITY TO BE HERE WITH YOU TODAY AND SHARE MY VIEWS.

THE PROCESS OF TECHNOLOGICAL INNOVATION INVOLVES BRINGING INTO BEING NEW AND IMPROVED PRODUCTS AND PROCESSES WHICH BENEFIT THE ECONOMIC QUALITY OF OUR LIVES. WITHIN THIS PROCESS RESEARCH AND DEVELOPMENT PLAYS A VITAL ROLE IN IDENTIFYING AND APPLYING PRACTICAL PRINCIPLES OF OUR SCIENCE AND TECHNOLOGY. IT IS HERE THAT THE GROUNDWORK AND FOUNDATION IS LAID WHICH DETERMINES THE SOUNDNESS OF THE INDUSTRIAL ESTABLISHMENT AND THE ECONOMIC GROWTH OF THIS NATION.

MR. CHAIRMAN, AS WE ARE ALL AWARE, THE MINIMAL PROGRESS OUR NATION HAS MADE IN RECENT YEARS RELATIVE TO TECHNOLOGICAL INNOVATION HAS BEEN OF GREAT CONCERN. IN RECENT STUDIES PERFORMED BY THE NATIONAL SCIENCE FOUNDATION, SERIOUS AND ALARMING TRENDS HAVE BEEN IDENTIFIED. IF I MAY, I WOULD LIKE TO SHARE WITH YOU SOME OF THE MORE MAJOR OBSERVATIONS NOTED IN THE NSF REPORT ON SCIENCE INDICATORS.

FIRST, INVESTMENTS IN R&D HAVE POSITIVE LONG TERM EFFECTS ON PRODUCTIVITY AND ECONOMIC GROWTH. FROM 1970 TO 1980 PRODUCTIVITY (MEASURED BY OUTPUT PER WORKER HOUR) IN U.S. MANUFACTURING INDUSTRIES INCREASED ONLY 28% COMPARED TO INCREASES OF 102% AND 60% FOR JAPAN

AND WEST GERMANY RESPECTIVELY. IN ADDITION, WEST GERMANY AND JAPAN HAVE HELD THE HIGHEST RATIOS OF NATIONAL CIVILIAN R&D EXPENDITURE TO GNP OVER THE PAST TWENTY YEARS. THE FIGURES FOR JAPAN AND WEST GERMANY IN THE LATE 1970'S WERE 1.87 AND 2.18 RESPECTIVELY, IN CONTRAST TO 1.61 FOR THE U.S. IN 1981.

IT IS IMPORTANT TO NOTE THAT U.S. INDUSTRY HAS RECOGNIZED THE IMPORTANT ROLE OF R&D AND IN TURN, HAS NOT BEEN RELUCTANT TO PROVIDE FINANCIAL SUPPORT TO THIS EFFORT. PRIVATE SECTOR FUNDING CONTINUES TO BE THE BULK OF RECENT R&D EXPENDITURES, AMOUNTING TO TWO-THIRDS OF THE TOTAL SPENT. THIS PRIVATE SPENDING IS AT ITS HIGHEST LEVEL HISTORICALLY. FURTHERMORE, THE GROWTH RATE OF PRIVATE SECTOR R&D FUNDING HAS BEEN HIGHER THAN FEDERAL FUNDING. HOWEVER, PRIVATE SECTOR R&D INVESTMENT MUST BE CONTINUALLY STIMULATED TO BRING ABOUT INCREASED INVENTION. CLEARLY, RECENT PATENT DATA IMPLY A DECLINE IN THE PRODUCTION OF AMERICAN TECHNICAL INVENTIONS BY CORPORATIONS. FROM 1970 TO 1978 THERE WERE DECLINES IN U.S. PATENTS OF 2% FOR ALL INVENTORS AND 3% FOR COMPANY-EMPLOYED INVENTORS. COMPARED TO THESE VALUES, FOREIGN PATENTS IN THE UNITED STATES FROM 1963 TO 1976 INCREASED AT AN AVERAGE RATE OF 15% PER YEAR.

THE SIGNS ARE CLEAR: THE PRIVATE SECTOR IS WHERE R&D HAS ITS PRIMARY ECONOMIC RESULTS AND NEW EFFORTS SHOULD BE CONCENTRATED THERE. IT IS THIS AREA WHERE WE MUST PROMOTE INVESTMENT TO THE MAXIMUM EXTENT POSSIBLE. AS VICE-CHAIRMAN OF THE HOUSE REPUBLICAN TASK FORCE ON HIGH TECHNOLOGY INITIATIVES, I SHOULD EMPHASIZE OUR PURPOSE AND OBJECTIVES. THAT IS, TO SUPPORT A LEGISLATIVE AGENDA WHICH PROVIDES FOR THE PROPER ECONOMIC CLIMATE TO STIMULATE

INVESTMENT, ENCOURAGE INVENTION AND REWARD INNOVATORS AND ENTREPENEURS.

S.738 IS THE TYPE OF LEGISLATION THAT THIS COUNTRY NEEDS TO CREATE THE ECONOMIC CLIMATE OF WHICH I SPEAK. IT IS ESSENTIAL THAT OUR GOVERNMENT SIGNAL THE PRIVATE SECTOR THAT WE NEED TO STIMULATE PRIVATE SECTOR INNOVATION IF ECONOMIC RECOVERY IS TO SUCCEED. PROVIDING TAX INCENTIVES IS ONE OF THE FEW TOOLS THAT CONGRESS CAN USE WITHOUT THE CREATION OF A NEW BUREAUCRATIC ENTITY OR MAJOR SUBSIDY. THE ELIMINATION OF THE SUNSET PROVISION OF THE ECONOMIC RECOVERY TAX ACT OF 1981 WILL PERMIT THE PRIVATE SECTOR TO PLAN LONG TERM FOR THEIR TECHNOLOGICAL INNOVATION. IT WILL SHOW THE PRIVATE SECTOR THAT GOVERNMENT UNDERSTANDS THE NECESSITY TO PLAN FOR THE FUTURE AND NOT CONCENTRATE ON SHORT TERM AND QUICK FIX APPROACHES TO OUR ECONOMIC TROUBLES. R&D PLANNING IS A COMPLEX AND RISKY VENTURE WHICH REQUIRES HARD-NOSED DECISION-MAKING AND LONG TERM FINANCIAL COMMITMENT. AS A FORMER MANAGER OF RESEARCH PROGRAM DEVELOPMENT AT LEHIGH UNIVERSITY AND A FORMER PROFESSOR AND RESEARCHER, I SPEAK FROM FIRST HAND EXPERIENCE. CORPORATIONS WILL NOT MAKE THE NECESSARY COMMITMENT OF RESOURCES WITHOUT LONG RANGE, STABLE INCENTIVES. A PROVISION SUCH AS A PERMANENT TAX CREDIT COULD MAKE R&D PROGRAMS FEASIBLE THAT OTHERWISE WOULD HAVE BEEN DELAYED OR CANCELLED.

IN THESE DAYS OF BUDGET CONTROVERSY AND YAWNING DEFICITS, LET US TURN TO THE PRIVATE SECTOR WITH INCENTIVES TO ADDRESS THE PROBLEM OF TECHNOLOGICAL INNOVATION AS A KEY TO ECONOMIC GROWTH AND LET US IMPART TO THEM A GOVERNMENT POLICY ON WHICH THEY CAN RELY.

WITH SO MANY VARIABLES IN R&D PLANNING, CONSISTANCY IN GOVERNMENT TAX POLICY WOULD PERMIT A LEVEL OF CONFIDENCE FOR LONG TERM INVESTMENT DECISIONS.

DELETION OF THIS SUNSET PROVISION WILL GIVE THE PRIVATE SECTOR AMPLE PLANNING TIME FOR FINANCIAL COMMITMENT AND THE OPPORTUNITY FOR THE CONGRESS TO EVALUATE THE EFFECTIVENESS OF THIS TAX POLICY.

AGAIN, MANY THANKS FOR THE OPPORTUNITY TO APPEAR BEFORE THIS COMMITTEE TODAY TO EXPRESS MY VIEWS ON THIS NECESSARY LEGISLATION. I URGE ITS PASSAGE.

Congressman ZSCHAU. Thank you very much. I will just comment briefly about the contents of the prepared statement.

I think we are finding, happily, in Washington these days enormous interest in promoting high technology. The President has made a commitment to maintain our technological leadership. There are a great many bills that have been introduced to improve high technology. I think it is because of the performance of the industry in terms of job creation, exports, productivity improvement, that this interest in high technology has grown.

The question that has to be asked is, "What is the proper role for the Federal Government in promoting high technology?" There are some who have proposed that we should have some sort of Government planning board to target specific technologies or industries or companies or products and allocate resources, as they imagine MITI, the Ministry of International Trade and Industry, in Japan, operates.

My feeling is that sort of central planning approach is inappropriate and would be doomed to failure. Rather than targeting industries or technologies, what we should be doing is targeting the process—the process of innovation. That is, Government should be creating the environment in which it is likely that innovation and technological advances will flourish.

My assessment of that process is based on not only my own experience in the high technology industry, but also experiences of others in my district, the Silicon Valley, which has some 700 high technology companies in and around it.

The process of innovation requires four prerequisites or conditions. Proper Government policy should make sure that those conditions are maintained.

No. 1, we need a strong commitment to basic research, the foundation for future products. No. 2, we need incentives for innovators, entrepreneurs and investors to take the kind of risks that are inherent in high technology. No. 3, we need an adequate supply of trained technical people to do the work. And, No. 4, we need adequate opportunities, not only domestically but foreign opportunities, to market our products.

The bills that are before this committee and which are the subject matter of this hearing focus on two of those elements. One is the incentive for risk taking, and the second is the availability of trained technical people. I would like to comment on each of them briefly.

Senate bill 738 would make permanent the R&D tax credit. I would like to associate myself with the comment of my colleague from Massachusetts, Congressman Shannon. I believe that he was right on target. This is an appropriate type of incentive for companies; it has demonstrated at least early signs of working, but it can't work if it is only temporary. The planning cycle for R&D projects is far longer than 2 years. The uncertainty created by the sunset provision currently in the law, I believe, is limiting the effectiveness of the tax credit. I strongly urge that the tax credit be made permanent.

I think that it is important to point out that the tax credit would be in effect in any case through 1985, so that the short-term revenue loss would be reasonably small. However, the effect on long-term R&D would in the meantime be taking place if we made it permanent now. I think that is a good trade-off when we have to be concerned about tax revenues in this period of high budget deficits.

I think also, although it is not part of S. 738, that this would be an appropriate time to review the tax credit on other grounds. There are other improvements that might be made. One of the current controversies regarding the credit is how software should be treated. Regulations have been written that may define software too narrowly. Software is becoming a major part of any computer systems design, and if the regulations are too narrow, it may be necessary to clarify the legislative intent through a new piece of legislation.

In addition, the tax credit currently does not enable the small companies, the start up companies, to take full advantage of the credit. It is assumed for the purpose of calculating the increase in R&D expenditures that the base period level above which one calculates the increase is no less than 50 percent of the current years expenditures. Large companies don't grow at a rate of more than 100 percent in R&D per year, but small companies, just starting out, could be growing much faster. Under the current law, the small companies could not take full advantage of the tax credit. These small companies, I feel, are the ones that are most likely to generate new ideas. That is another reason why we should examine the specific provisions of the tax credit.

Moving on to S. 1194 and S. 1195, I just want to commend you, Mr. Chairman, and Senator Bentsen for your leadership in offering these bills directed at what I consider to be the key problem facing the high technology industries these days. The scarcity of trained technical people. We have in the electronics industry, for example, studies that indicate that there will be a shortfall of about 16,000 engineers per year throughout the mid-1980's. It is well-known that Japan, a country with half our population, turns out more engineers per year than we do.

This is, in my opinion, a result of a lack of capacity at college and university engineering schools. It is a financial problem. It takes money in order to attract faculty. We currently have about

2,000 faculty openings in our colleges and university engineering departments that are not filled. It also takes money in order to provide equipment for those people.

I believe that instead of this being a purely Government problem, private industry has an important role to play. After all, private industry generates the requirements for these engineers. Companies are very interested in getting the engineers trained. Already, we have seen companies finding ways to make contributions to colleges and universities for engineering department capacity increases. However, I think that Government also has a role to play by providing some incentives. The tax incentives in S. 1194 and S. 1195 should result in more money being directed toward supplying the equipment necessary to train engineers and science and mathematics majors in colleges, and it should also result in money to pay faculty and provide loans for students. I think that those bills have a nice balance of incentives with safeguards in them so that abuses won't occur. By using the tax incentive concept, we are encouraging private industry to find those areas where money can be best used without setting up a bureauracy in the Government that would be necessary to approve and monitor the giving of grants.

These two types of legislation—S. 738, to make permanent the effective incentive for research and development and the Senate bills providing incentives for contributions to colleges and universities for educational purposes—are great steps forward. They are consistent with what I envision to be the proper role of government: To create the environment in which high technology and innovation can flourish.

I appreciate the chance to appear before you, Mr. Chairman, and I would be happy to answer any questions you might have.

Senator DANFORTH. Congressman, thank you very much for an extraordinarily thoughtful, though provoking presentation. I think that your comments on targeting are exactly right. The notion that the United States is going to follow the Japanese model is, I think, very farfetched. If we were to target industries in this country, more likely we would be targeting those industries with the most political effect, and we would end up bailing out industries rather than targeting the small but promising growth industries. And I think that this idea of targeting a process rather than specific industries is much more in keeping with our way of doing things and offers much more promise.

With respect to S. 1194 and S. 1195, the origin of the whole concept of R&D tax credits and tax credits for businesses, contributing to universities for research, and so forth, came out of a discussion I happened to be in on one day, very informal, and the two participants, other than myself, were a very well-known scientist and a university president. The scientist was in the private sector. And one thing that they agreed on was the importance of attempting to build some relationship between industry and academia with respect to research and science. They felt that that was one of the most important contributions that could be made: to have industry more supportive of education and to have a relationship between scientists in academia and in the private sector. And that was really, in my own mind, the origin of my thinking on the kind of bill that S. 1194 turned into, especially with respect to the higher education portion of that bill. And I think that you have pointed out that effect also in your testimony. And I appreciate your comments.

Congressman Zschau. If I may, let me just add a comment to what you said. There are many people who have asked me why is it that there are so many high technology companies in the Silicon Valley area. I think part of the answer is due to the fact that the dean of the engineering school in times past, Dean Termon, at Stanford University, had the concept of a close relationship between the academic operations in his department and industry. He fostered a close communication. There is a lot of interaction that takes place today. The fact the that interaction was not only tolerated but encouraged helped to promote the phenomenon that we now see in Silicon Valley.

Senator Danforth. That is undoubtedly true in Silicon Valley. I would guess that it would also be true wherever there are concentrations in this country of high tech industries, that there is in very close geographical proximity a major research university, and that there is an interchange between the two. And this bill is designed to encourage that kind of interaction.

Senator Heinz?

Senator Heinz. No questions, Mr. Chairman.

Senator Danforth. Thank you very much, Congressman.

Congressman Zschau. Thank you very much, Mr. Chairman.

Senator Heinz. Mr. Chairman, I would like to make an observation if I may before our next distinguished witness, Buck Chapoton, makes his presentation, which is this: The bills before us—your bill, Mr. Chairman, S. 738 and S. 1194, and Sentator Bentsen's bill, S. 1195—are all, in my judgment, very laudable bills. I support their goals; indeed, I have sponsored or cosponsored several of them. But I am concerned Mr. Chairman, about the fact that there are a number of basic industries—steel, chemical, mining, among them—that simply are unable to take advantage of the research and development credits that were offered. There are profitable industries that can take advantage of them. But because of the way our tax code works, it is not possible for an industry that is not making money and paying taxes to take advantage of an investment tax credit or a research and development tax credit.

In the case of the steel industry, it lost $3 billion last year. Maybe it will come out even or a little bit ahead this year. But even if it does come out ahead this year, it has so many unexpired investment tax credits that the research and development credits proposed to be expended or expaned upon will be of little or no value to industries like the steel industry. It seems to me that our most troubled industries, industries which I know from personal discussions have many technological opportunities, not just to go to the next generation of technology but to go a generation beyond that generation, to leapfrog so-called advanced technology and become truly high tech industries, will not be able to do so under the legislation proposed before us.

Now I am aware that we have not in this committee been terribly enthusiastic about the refundability of tax credits, although I think we voted for them on tuitition—I think the committee approved them for tuition tax credits the other day. It seems to me that we either have to make these research and development tax credits refundable or find an equivalent mechanism that will allow them to be of value to our most troubled industries that are able to move ahead to find research and development opportunities and to become once again the high tech industries that they were at the end of World War II, or even in some cases through the 1960's. It seems to me if we don't do that, we indeed, Mr. Chairman, are doing something that I know you don't want to do, which is to pick winners and losers.

Current law, as it stands, picks winners among only those who are currently ahead in the race, and it consigns not just to the back of the pack but to falling at the wayside during the course of the race industries that are not now but could be in a healthy financial position in the future. So I hope, Mr. Chairman, as we continue our deliberations here that we will take a careful look at how we can make it possible for industries that can and do have a future, if they are allowed to participate in the kinds of incentives that are contemplated by you, myself and others in this committee, how, in fact, we can accomplish that goal. I thank you, Mr. Chairman.

Senator DANFORTH. Well, maybe Secretary Chapoton can help us think creatively on this. [Laughter.]

Senator HEINZ. That is why I waited for him to arrive, Mr. Chairman.

STATEMENT OF HON. JOHN E. CHAPOTON, ASSISTANT SECRETARY FOR TAX POLICY, DEPARTMENT OF THE TREASURY, WASHINGTON, D.C.

Mr. CHAPOTON. Thank you, Mr. Chairman. I have a quite lengthy statement. I will summarize it. I think I would like to spend most of my time on the S. 738, the proposal for a permanent extension of the tax credit for incremental research and development.

We do appreciate the opportunity to present our views to the subcommittee this morning. The administration strongly supports the objectives of the R&D credit. We believe the credit should be extended to enable taxpayers to plan their research and experimental activities with a certainty that the credit will be available, and we are supporting an extension of the credit for 3 years through December 31, 1988.

The effectiveness and efficiency of the credit is currently under review within the administration by an interagency working group. Our review thus far indicates that some modifications of the credit may be called for when the credit is extended. We would like to come forward at a later time to the subcommittee with specific recommendations for improving the credit.

Congress enacted the credit for R&D expenditures in order to encourage industry to undertake the risky research and experimental activities that may lead to productivity enhancing innovation. The need for such activities cannot be disputed: innovation is essential if the United States is to retain and improve its competitive position in the world economy.

To provide the greatest incentive, the credit must flow to those industries, and to particular taxpayers, that devote increasing amounts of resources to these risky activities. For that reason, the credit is an incremental credit. The level of qualified expenditures that increases over a base period is what is entitled to the 25 percent credit.

R&E is a term used to describe an organized activity undertaken by a firm to develop new products and services or to modify existing products and services. Commercial and industrial R&E leading to technological innovation is unquestionably beneficial to the economy. The more successful R&E effort in the economy, the higher the rate of productivity and growth.

Normally, we would expect that business will invest in R&E to the point that the expect return on investment is equal to returns from other investments, but the level of profit-motivated R&E frequently will be inadequate because businesses may not enjoy the full return realized from their innovation. For this reason, Government intervention through a mechanism such as the credit is definitely warranted.

Broad Government support of R&E is particularly essential in the basic research area. Substantial benefits from basic research are available to society generally, but the use of the results of the research by one does not impair another's ability to use it. Thus, basic research has all the characteristics of a public good which should be supported by Government. Similarly, commercial and industrial R&E also may add to the stock of knowledge that may be used by others, with the result that the innovator will not enjoy the full economic return from its efforts. Therefore, Government aid to the industrial and commercial R&E is also appropriate.

Our experience in administering the credit so far has been limited, but we believe that you can draw some preliminary indication as to how the credit is being used. And we think this information needs to be analyzed further to see how the credit can be improved.

We have made a preliminary review and analysis of 1981 tax returns the first year that the credit was in effect. Our sample represents some 11,700 corporations that reported $1.9 billion of qualified incremental R&E expenditures. These corporations claimed half a billion dollars of R&E credits. Some of the companies must carry over all or a portion of the 1981 credit, since the credit can, as Senator Heinz has pointed out, offset only actual tax liabilities. And also I want to mention that the tax returns for a number of very large companies, many of which will have large R&E budgets, are not yet available and are not included in the numbers I am giving you. Of the total credit claimed by the companies for which we have data, half went to 65 companies, each of which reported $1 million or more of credit. These 65 companies may be divided into two broad groups. The first consisting of companies whose main business are in the high tech fields of pharmaceuticals, computers, electronics, aerospace, scientific instruments, and photographic equipment. Those 28 companies account for $107 million of the credit claimed.

The second group consists of 35 companies in the oil industry and in the more traditional heavy manufacturing fields such as chemicals, rubber, steel, motor vehicles, farm and construction equipment, industrial machinery, and electrical equipment. These heavy industry companies earned $129 million of credit. Virtually all of the companies in both groups are large and have large R&E budgets.

The credit was not used exclusively by manufacturing companies, however. Of the total number of companies in our sample that claimed credits, almost half have their principal line of business outside of manufacturing. These companies were mainly in the trade, service, public utility, and financial sectors. They claimed growth in qualified R&E from 1980 to 1981 of 91 percent. While these companies account for only 17 percent of the total credits claimed, the large number of companies in this category and their extraordinarily high growth rate in R&E indicates that their share of the credit is likely to increase in the future.

Among taxpayers who claimed the R&E credit were taxpayers in such lines of business as fast food restaurants, baked goods, home building, publishing, banking, stock brokerage and movie production. Although we do not have data indicating the particular activities for which the credit was claimed by these taxpayers, we would anticipate that they do not involve the high technology or high risk research that is involved in the other companies.

In addition, it appears that the credit provided significant benefits to certain foreign manufacturers. Several domestic sales subsidiaries of foreign automobile and electronic manufacturers have claimed the credit. Again, the data is lacking concerning the particular activities that gave rise to the credit in these instances, but we would surmise that these activities may be related to research applicable to product design which will be incorporated in foreign manufacturing rather than the companies' U.S. sales operations

The credit can only be used to offset a taxpayer's tax liability. As Senator Heinz has pointed out, companies with tax losses are not able to use any credit currently. Overall, the companies in our sample were able to use in the current year only about 59 percent of the credits claimed for 1981. The balance had to be carried forward to be claimed against future tax liability. In general, the largest companies, those with $250 million or more in assets, were able to use about 60 percent of their R&E credits earned, and the smaller companies less than $1 million of assets were able to use only about 45 percent of the credits earned in 1981.

As I mentioned, we are supporting extension of the credit. We would like to consider some improvements in the credit. We want to suggest three specific areas in which improvement might be considered. First, we think it is going to be necessary to define "research" or "experimental activities" with more precision. Second, to encourage taxpayers to increase the amount of real resources dedicated to R&E, it may be desirable to index the "base" expenditure to take into account inflationary increase in the cost in the incremental feature of the credit. Third, we should attempt to make the credit a more effective incentive for startup companies and the loss companies that Senator Heinz has mentioned. We are studying these matters and plan to come forward, as I mentioned, to the committee with specific recommendations in the future.

Turning now, Mr. Chairman, to S. 1194 and 1195, both of these bills are designed to encourage research training and research endeavors at all levels of education. The bills are similar but not identical. Section 2 of each of the bills would provide increased charitable deductions for contributions by corporations of computers and research equipment. Section 3 would modify the tax credit—the R&D tax credit—as it relates to contributions by corporate taxpayers for basic research performed by colleges and universities. And section 4 provides a special exclusion from gross income for amounts that graduate students receive in the form of scholarship, grants, loans or foregiveness of loans. The most important aspect of these bills, the one I will spend the most time on, is section 2, which relates to the contributions of computers and science equipment.

Under current law, with certain limitations, the amount of cash or fair market value of property contributed to a charitable organization qualifies for the charitable deduction. Limitations are imposed with respect to contributions of ordinary income property, that is, to the extent, if sold, the proceeds would be taxed as ordinary income rather than capital gain. In general, in the case of such property, the taxpayer's deduction is limited to his basis in the property. And under current law, there is no deduction for services contributed to charity in excess of the taxpayer's out-of-pocket cost in performing the services.

There are two exceptions to the general rule with respect to ordinary income property. One relates to gifts of inventory for the ill, the needy, or infants, which is not related here. The second exception, which these bills would expand, involves corporate gifts of scientific equipment and apparatus to colleges and universities for research and experimentation. Section 2 of the bill would expand this provision in two ways. First, the current law exception would be made available for gifts of computer equipment and related services to primary and secondary schools, and, second, the current exception for gifts of scientific property to colleges and universities would be broadened.

In the case of the computer, the gift of computers, the bills provide that the taxpayer must provide training in the use of the contributed equipment, and there are limits on certain technical specifications that the computer equipment must meet to qualify for the deduction.

If the conditions are met, the deduction is the same as the present law exception for gifts of scientific property to colleges, that is, the cost of the property plus one-half of the unrealized depreciation, not to exceed twice the taxpayer's basis in the property. In addition, in these bills, the present rule would be expanded with respect to the cost of providing training. The taxpayer's basis in the property would include the cost of providing the training to the employees of the recipient organization.

The bill also provides a special deduction for the value of services contributed with respect to contributed equipment. In the case of scientific property, the broadening is to expand the type of property, to include software and to include not only inventory but to include property that the taxpayer has used in his own trade or business, a piece of equipment, for example, that has been used and appreciated by the taxpayer. And the uses of the property which the property may be put is expanded to cover the physical and biological sciences, as well as computer science education and vocational education.

The Treasury Department opposes section 2 of these two bills. In our view, these changes would create an open-ended expenditure program funded by the Treasury but administered by private taxpayers to place computers and scientific equipment in schools throughout the country. We, of course, recognize that the end result of having computers in every school is highly desirable, but the taxpayers in this case would bear ultimately the entire cost of funding the program. And I think you then have to judge the program in the same manner as a direct appropriation. We have to question whether gifts of computers should be favored over other types of gifts, of books, for example, and whether gifts of repair services for computers should be preferred over gifts of doctors 'services to hospitals, for example.

The direct cost of the benefits available under these bills would, as I mentioned, shift most or all of the cost of the gift to the Government. And we would point out that the donors can and would anticipate receiving substantial commercial rewards in the form of future sales to schools and students' families. We do not think the commercial motivation, such as this, should be preferentially awarded through a charitable deduction.

We have some more in the nature of technical concerns about the bill. For example, with respect to gifts of property used in a taxpayer's trade or business, the deduction is granted without regard to the value of the property, so that a taxpayer could take 3-year ACRS property, depreciate it to zero, and then claim a charitable deduction for one-half of its cost at the end of the 3-year period. And we also raise concerns about allowing the cost of training services as a part of the cost of the equipment in computing the value of the deduction. That would result in a double or even triple deduction for the cost of the training since the cost could be counted twice in determining the taxpayer's contribution deduction and could also be deducted as an ordinary business expense under section 162 of the Code.

There are three provisions which would modify current law, which we would not oppose. We understand that gifts of computer equipment, of course, is virtually worthless without a gift of the relevant software, and that the cost of purchasing the software could be prohibitive. Assuming that Congress intended the schools benefit fully from the receipt of computer equipment, and from research and training under the present law exception, then we think the gift of software should qualify for the enhanced deduction as well. Also the current law requirement that inventory must be manufactured by the taxpayer, we are informed, disqualifies many potential donors from the gift. We question whether Congress intended to disqualify all of these taxpayers, and believe that that requirement that the taxpayer manufacture the propertv should be reexamined. And, third, the requirement that qualifying property be manufactured within 6 months of the date of the contribution of the property, as opposed to the 2-year rule under existing law, we think would be a helpful change, and that it will assure that schools are not receiving technologically outdated equipment.

Section 3 and 4 of the bill, Mr. Chairman, let me just go over very hurriedly. Section 3 would allow the present law rule which allows an R&E credit for contract research expenses contributed to colleges and universities. We would support the objectives of these bills. We do want to raise questions about the efficiency of the approaches followed in these bills, and we would like to work with the subcommittee to determine whether the bills could be modified to become more effective. We are particularly concerned about the change in the bills which would remove the incremental feature, would take the base period requirement out of the law so that taxpayers would be entitled to a full credit for continuing their present practices at their present level of gifts to colleges and universities for scientific education when the overall scheme of the credit is designed to encourage increased activity in this regard. Also, we question the fact that there is no requirement that schools utilize the funds to hire additional faculty or create new scholarships. There is an attempt through an agreement with the schools to accomplish this, but since money is fungible, we don't think that would have any effect, and we think these agreements would be meaningless.

Let me skip to section 4. Section 4 of the bill simply would modify the exclusion from gross income for scholarships and grants. Basically, current law provides that amounts received for scholarships or fellowships are fully or partially excluded from gross income. The exclusion is based on whether or not there is a significant quid pro quo from the recipient in the form of either current or future services. These bills would attempt to expand the exclusion with respect to taxpayers in the scientific area if they agree to provide further scientific work in the teaching field. We think that instead of a blanket exclusion for all rewards conditioned on future teaching services, standards should be developed to identify which scholarship awards are not truly compensatory even though they impose some conditions on the recipient, and we think those standards should apply to students in all areas of studies, not just students in the sciences.

Mr. Chairman, I think I will conclude. The final bill before you today involves a totally unrelated subject, that is, the subject of what happens on mortgage debt forgiveness to an individual homeowner when he is able to pay off his mortgage at a reduced rate. We do think there is some merit in considering some relief in this area. We would oppose retroactive relief, but, as the testimony points out, we do think some type of relief should be considered in this area.

Senator **Danforth**. I thank you very much, Mr. Chapoton. On 1194 and 1195, with respect to the deduction up to twice basis for the donation of computer equipment to elementary and secondary schools, the original position of the administration was to oppose that concept. Then, as I recall, the administration decided to support the concept. Now it is my understanding that once again the administration opposes it. Is that right?

Mr. **Chapoton**. That is correct. Mr. Chairman, this is much expanded. We estimate the revenue cost is about 10 times the bill that was before you last year. That was a very temporary item. This is 5 years, or it would basically be permanent. And the types of equipment that qualify are broadened, and the service element is included, which was not last year.

Senator **Danforth**. And with respect to contributions of scientific equipment to higher education, the present law is that the extra deduction, the twice basis deduction, is permitted for contributions of equipment used in research, but not equipment used in education and math science and engineering.

Mr. **Chapoton**. That is correct.

Senator **Danforth**. And does the administration oppose extending this to equipment used in education, or does the administration favor a repeal of the existing double deduction on research?

Mr. **Chapoton**. We do not favor repeal of the existing rule. I think I may have misstated the existing rule. It is for basic research, and for education in the math and science areas as well. We are not proposing repeal of that, no, sir.

Senator **Danforth**. So if a manufacturer of scientific equipment were to donate that equipment to a university for research purposes, that equipment would be deductible up to twice basis.

Mr. **Chapoton**. That equipment would be deductible up to twice basis, and that equipment would qualify under our proposed regulations for the R&E credit as well.

Senator **Danforth**. However, if the equipment were not contributed for research but instead for education in science or engineering or math, then it would not be subject to the deduction.

Mr. **Chapoton**. I believe it would be subject to the deduction if it were in education and science or math, Mr. Chairman. Let me verify that.

[Pause]

Mr. **Chapton**. Yes, sir, it would be.

Senator **Danforth**. I thought that the purpose of the bill was to apply the same rule to equipment donated for educational purposes as now exists for research purposes.

Mr. **Chapoton**. Well, my understanding of the present law is that it does qualify. The bill would expand the type of equipment and would expand the use of the equipment into vocational schools, 1195 into vocational schools.

Senator **Danforth**. No. I am talking about higher education right now, just the higher education portion of 1194, not the elementary and secondary.

[Pause]

Mr. **Chapoton**. Well, Mr. Chairman, I think, as I understand the purpose of the bills is to broaden the permitted uses beyond training related to research but just general education. And I guess that is your point. It would move it away from the use of equipment targeted for research but more for basic education.

Senator **Danforth**. Yes. But limit it to math, science, or engineering education.

Mr. **Chapoton**. Yes, that's right. Your bill would limit it to math, science, and engineering, right.

Senator **Danforth**. So let's suppose that X corporation manufactures a piece of scientific equipment, say it manufactures a computer, and it wants to give the computer to, say, the University of Missouri. If that computer is to be used for research, then it gets the double deduction?

Mr. **Chapoton**. That's right. If it is research or related to research training.

Senator **Danforth**. And if it is to be used for education in the engineering department, somehow teaching people who are students in the engineering department, that would not be subject to the double deduction in your view, should not be?

Mr. **Chapoton**. I believe that is correct, yes, sir.

Senator **Danforth**. Isn't that a very fine line to try to draw?

Mr. **Chapoton**. No question about it. Wherever you expand this, the next line is going to be very difficult to draw.

Senator **Danforth**. That's the present law, the fine line.

Mr. **Chapoton**. Absolutely.

Senator **Danforth**. My view is that if a company that makes the equipment wants to contribute it to a university, it should be treated the same whether the intention is to use it for research itself or for educating people in math, science, or engineering.

Mr. **Chapoton**. Well, I couldn't argue with the fact that that is a desirable goal. As I remember when this came up 2 years ago, the argument was made that we should enhance basic research, and that was the point, that this gift should be available for basic research. If ever it could be expanded, logically, I agree, to other types of education, and it obviously could be expanded far beyond the areas your bill would expand it to. And I think that suggestion would be made if we expand it.

Senator **Danforth**. Well, that's not what I am suggesting in this bill. I am just suggesting that if, say, IBM wanted to contribute some equipment to a university for research purposes, and the university wanted to use the equipment to help educate its people in the school of engineering, then that should be subject to the same treatment. I mean, it seems to me that our purpose should be not only to encourage our universities to conduct research but should be to encourage our universities to train new generations of scientists and engineers where there is now a shortage. And for us to take a position where we are encouraging the same piece of equipment to be used somehow purely for research and not to be used for education is a kind of an odd view of what the law should be.

Mr. **Chapoton**. Mr. Chairman, this is exactly comparable to a Government expenditure program. The Government is paying virtually all the cost of whatever you decide that the Government is not administering, that is, the companies are deciding what they want to favor, and are doing it at virtually no cost, and in some cases under this bill, at indeed a profit to the company. So you then have to decide what types of programs those companies can choose. The decision 2 years ago was to attempt to limit it, recognizing that it was basically a Government program, to basic research. And there is no question the desirability of broader education. The question is whether we want a Government program funding equipment for broader education.

Senator **Danforth**. Right. That is correct. I think that is the question, whether our aim is to provide an advantage to education, whether higher education or elementary and secondary education in math, science, engineering and related fields.

Mr. **Chapoton**. It is, in effect, an educational program, and it is administered by private industry.

Senator **Danforth**. Well, I am not sure it is administered by the industry. There has to be a willing donor and there has to be an educational institution that is willing to receive it. But I had thought that one of the points that has been made by the President himself is that we should be encouraging not just Government to make direct grants to education or any other nonprofit organization, but we should attempt to encourage the private sector, the American people, to contribute to our nonprofit organizations, including our colleges and universities. And it seems to me that this effort of Government to try to make it attractive for the private sector to do its part is a good thing, not a bad thing.

Mr. **Chapoton**. Mr. Chairman, I don't disagree for a moment that it is a good thing. But the point is that there is a no cost program, that is, a donor will have little, if any, cost, and in some cases under these bills could come out ahead by the contribution. So there would be no charity in the charitable gift.

Senator **Danforth**. Well, I would like to study some of your examples of no cost. I don't think it would be no cost. The deduction of double basis does not recover the entire cost. It recovers a very substantial portion of the cost if that cost doesn't include general administration and overhead within the company, and so on. But there is a cost to the company. But I think that the general principle, and really the bone of contention, is this: Is our principle effort to be to encourage scientific equipment, computers, to be available for kids to be educated, or instead is that going to be the secondary concern, and our primary concern is that nobody should get tax advantages? But it seems to me that any time you are talking about a tax expenditure you are talking about providing an advantage for somebody or some business to do something that is thought to be socially desirable. I guess the question is, what has the heaviest weight, the socially desirable objective, on one hand, or the need to prevent anybody from getting a very substantial tax advantage?

Mr. **Chapoton**. I think that our main quarrel—and I just want to emphasize this—that our calculation is that under these changes, and particularly when you add the services part, a deduction for the services under the charitable guise, and also entering into the basis for the 200-percent limit, that we see a definite profit result, that is, the donor coming out ahead financially as a result of the gift.

Senator **Danforth**. Well, we can work that out.

Mr. **Chapoton**. All right.

Senator **Danforth**. If that is true. I mean, obviously, nobody wants anybody to come out ahead. But couldn't the administration suggest some modifications to prevent that from happening, as opposed to just a really blanket dismissal of the whole idea?

Mr. **Chapoton**. Well, we would certainly like to work with you to prevent that from happening. I think you are then deciding to give an additional benefit to a certain type of activity. Then that is the judgment call that you were talking about earlier, that is, that you want to give an incentive for this type of gift over other types of gifts. I think we have trouble making those judgment determinations in the tax route. But I would concede readily that those are the judgments that can be made.

Senator **Danforth**. Can I ask, is the administration supporting the sunsetting of tax expenditures?

Mr. **Chapoton**. The sunsetting of tax expenditures? You mean, all tax expenditures?

Senator **Danforth**. Well, you certainly are in the case of the R&D credit.

Mr. **Chapoton**. We are supporting an extension of the present law sunset.

Senator **Danforth**. But you are still, as opposed to making the credit permanent, you are supporting a sunset version of it.

Mr. **Chapoton**. Well, we are proposing a 3-year extension. We are taking it through virtually the end of the decade. We are very supportive of the credit. So if there is a great concern about the date picked, I think that would not be a great moment to us. We do think the credit should be extended. We think it should be improved, and we are very supportive of it.

Senator **Danforth**. Does the sunsetting of tax expenditures for business tend to create uncertainty in the business community?

Mr. **Chapoton**. I think that sunset as it is approaching too near, as it is approaching in the near future, does create uncertainty. I think that is about to happen with the present sunset on the R&E credit.

Senator **Danforth**. Senator Heinz.

Senator **Heinz**. Mr. Chairman, thank you. Mr. Chapoton, you said that in your remarks that you would be sending down some recommendations as to how we might address the problems of industries, such as steel, chemicals, mining, and others, that are not either currently or expected to be soon able to benefit from the R&D tax credit. How soon would you be able to have such recommendations to us?

Mr. **Chapoton**. Senator Heinz, I don't know that I can be specific on that. We want to send recommendations on the credit, in general. That is one of the principal problems that we are having with the credit in the startup area and in the loss company area. But in the loss company area, it is a more difficult problem because—well, it is a difficult problem in both cases, because it does run head long into the problem this committee addressed in 1981 through the safe harbor leasing. It was our same concern at that time. It is a concern under ACRS, generally, and it is a concern here. I don't want to suggest that it is going to be an easy problem to address.

Senator **Heinz**. But do you have some timeframe?

Mr. **Chapoton**. No, I am afraid I cannot give you a timeframe. We, as I mentioned, have an interagency task force. I would think certainly it would be sometime during this summer, but I don't think I could be any more definite than that.

Senator **Heinz**. I would hope that Treasury would consult with those of us on the committee, and there are a number of us who have industries that have this problem.

Mr. **Chapoton**. Yes, sir, I know.

Senator **Heinz**. Can you keep us posted on your progress?

Mr. **Chapoton**. I would be happy to, yes, sir.

Senator **Heinz**. All right. Thank you.

Senator **Danforth**. Thank you, Buck.

Mr. **Chapoton**. Thank you, Mr. Chairman.

[The prepared written statement of Mr. Chapoton follows:]

For Release Upon Delivery
Expected at 9:00 a.m., E.D.T.
May 27, 1983

STATEMENT OF
THE HONORABLE JOHN E. CHAPOTON
ASSISTANT SECRETARY (TAX POLICY)
DEPARTMENT OF THE TREASURY
BEFORE THE
SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT
OF THE SENATE COMMITTEE ON FINANCE

Mr. Chairman and Members of the Subcommittee:

I am pleased to have the opportunity to present the views of the Treasury Department on the following bills: S. 738, which would make permanent the tax credit for research and experimental expenses; S. 1194 and 1195, which primarily concern the deduction for contributions of computers, scientific equipment, and related services to educational institutions; and S. 1147, which would provide special tax treatment of income realized upon the discharge of home mortgage loans.

S. 738
Permanent Extension of the Tax Credit for Incremental R&E Expenses

S. 738 would make the income tax credit for incremental research and experimental ("R&E") expenditures permanent. Under current law, this credit is scheduled to sunset on December 31, 1985. We welcome this opportunity to discuss the R&E credit program. The Administration strongly supports the objectives of the credit, and we believe the credit should be extended to enable taxpayers to plan their research and experimental activities with certainty that the credit will be available. For this reason, we support extending the

R&E credit for three years through December 31, 1988. The effectiveness and efficiency of the R&E credit is currently under review by an interagency working group within the Administration. Our review thus far indicates that modifications of the credit may be called for when it is extended. We plan to forward to the Subcommittee at a later time specific recommendations for improving the credit.

Objectives of the Credit

Congress enacted the tax credit for incremental research and experimental expenditures in order to encourage industry to undertake the risky research and experimental activities that may lead to productivity-enhancing innovation. The need for such activities cannot be disputed: innovation is essential if the United States is to retain and improve its competitive position in the world economy.

To provide the greatest incentive for increased levels of R&E, the benefits of the credit must flow to those industries, and to particular taxpayers, that devote an increasing amount of resources to these risky activities. This was the purpose of applying the credit only to the increase in the level of "qualified research expenses" incurred by the taxpayer.

"R&E" is a term used to describe an organized activity undertaken by a firm to develop new products and services or to modify existing products and services. In addition, R&E includes the creation of new or modified production and marketing techniques. Commercial and industrial R&E leading to technological innovation is unquestionably beneficial to the economy. The more successful R&E effort in the economy, the higher will be the rate of productivity growth.

Normally, it would be expected that business will invest in R&E to the point that the expected return on investment in R&E is equal to the expected returns from other investments. However, the level of profit-motivated R&E frequently will be inadequate because businesses may not enjoy the full return realized from their innovation. For this reason, government intervention -- i.e., subsidies for R&E investment -- is warranted.

Broad government support of R&E is particularly essential in the area of "basic research." Basic research is an activity principally intended to provide additions to knowledge that do not have specific commercial objectives. Since basic research cannot be self-supporting, its conduct depends on subsidies from those who engage in the research (i.e., acceptance of a rate of return below that attainable in market-oriented pursuits) and from those who voluntarily pay institutions to engage in basic research. Since the substantial benefits from basic research are available to society generally, while use of the results of basic research by one does not impair another's ability to use it, basic research has all the characteristics of a public good which should be supported by government.

Similarly, commercial and industrial R&E also may add to the stock of knowledge that may be used by others, with the result that the innovator will not enjoy the full economic return from its efforts. Therefore, government aid to industrial and commercial R&E also is appropriate.

Experience With the Credit

Although our experience in administering the credit has been limited, we believe that it provides a preliminary indication as to how the credit has been used. In addition, it suggests how the credit can be improved.

We have made a preliminary analysis of tax returns for 1981, which was the first year that the tax credit was in effect. Our preliminary sample of tax returns represents 11,700 corporations that reported $1.9 billion of qualified incremental R&E expenditures on their 1981 tax returns. These corporations claimed $0.5 billion of R&E tax credit. Some companies must carry over all, or a portion, of the 1981 credit, since the credit can only offset actual tax liabilities. The tax returns for a number of very large companies, many of which have large R&E budgets, are not yet available.

Of the total amount of credit claimed by companies for which we have data, half went to 65 companies, each of which reported $1 million or more of credit. These 65 companies may be divided into two broad groups. The first group consists of 28 companies whose main businesses are in the relatively "high-tech" fields of pharmaceuticals, computers, electronics, aerospace, scientific instruments, and photographic equipment. These 28 "high-tech" companies account for $107 million of credit. The second group consists of 35 companies in the oil industry and in the more traditional heavy manufacturing fields such as chemicals, rubber, steel, motor vehicles, farm and construction equipment, industrial machinery, and electrical equipment. These 35 "heavy industry" companies earned $129 million of credit. Virtually all of the companies in both groups are large companies and all have large R&E budgets.

The credit was not used exclusively by manufacturing companies. Of the total number of companies in our sample that claimed R&E credits, almost half have their principal line of business outside of manufacturing. These companies, mainly in the trade, service, public utility, and financial sectors, claimed growth in qualified R&E from 1980 to 1981 of 91 percent. While these companies account for only about 17 percent of the total credits claimed, the large number of these companies and their extraordinarily high growth in R&E indicates that their share of the credit is likely to increase in the future.

Among the taxpayers who claimed the R&E tax credit in 1981 were taxpayers in such lines of business as fast food restaurants, baked goods, home building, publishing, banking, stock brokerage and movie production. Although we do not have data indicating the particular activities for which the credit was claimed by these taxpayers, we would anticipate that these activities frequently did not involve "high technology" or high risk research.

In addition, it appears that the credit may have provided significant subsidies to certain foreign manufacturers. Several domestic sales subsidiaries of foreign automobile and electronics manufacturers have claimed the credit. Again, data is lacking concerning the particular activities that gave rise to the credit in these instances. However, we would surmise that these activities may have related to research applicable to product design which will be incorporated in foreign manufacture rather than the companies' United States sales operations.

The R&E credit only can be used to offset a taxpayer's tax liability. Companies with tax losses are not able to use any credit currently. Overall, companies in our sample were able to use in the current year only about 59 percent of the credits claimed for 1981. The balance had to be carried forward to be claimed against future tax liability. In 1981, the largest companies (i.e., those with more than $250 million of assets) were able to use approximately 60 percent of their R&E credits while the smallest companies (i.e., those with less than $1 million of assets) were able to use only 45 percent of their credits in 1981.

Possible Improvements to the R&E Credit

As I noted earlier, we support the extension of the R&E credit. Based upon our experience to date, we believe that consideration should be given to improving the credit in several respects. First, it is important to define research or experimental activities with more precision. Second, to encourage taxpayers to increase the amount of real resources dedicated to R&E, it may be desirable to index the "base" expenditures to take into account inflationary increases in costs. Third, we should attempt to make the credit a more effective incentive for start-up companies. We are studying these matters and plan to come forward with specific recommendations for improving the credit in the near future.

Pending the development of our specific recommendations, I would like to share with you some of the considerations that relate to how the credit might be improved.

Definition of Research or Experimental Activities. Code section 44F provides a tax credit equal to 25 percent of the excess of a taxpayer's "qualified research expenses" over the average amount of such expenses during a "base period." Qualified research expenses are defined as expenditures incurred in research or experimental activities, as that term is used in Code section 174 (relating to the deduction of R&E expenses). The legislative history of the R&E credit indicates that the existing administrative interpretation of the term "research or experimental" activities under section 174 was to be applied for purposes of the credit.

In the regulations issued under section 174, the standard for determining whether an activity was "research or experimental" in nature was imprecise. Prior to the enactment of the R&E credit, many expenditures were deductible currently either as R&E expenses or as ordinary and necessary business expenses. For this reason, the term "research or experimental" remained vague. The vagueness of this definition allows the assertion that the cost of developing virtually every product marketed in the economy should be treated under the R&E credit as qualified research expense. Supplying a more precise definition of R&E is not an easy task. It is difficult to specify what pre-production expenses are research and experimental expenditures and what pre-production expenses are not.

To illustrate, consider the process of developing a new product or process. In essence, a business will have an idea that it believes should be marketed in the form of a product for sale in the marketplace. The business will attempt to transform the idea into a working model and then evaluate and refine the model through the trial-and-error process. Use of this trial-and-error method in the development of a specific new product may constitute "experimentation" for tax purposes. For example, the credit might be claimed by a fast food chain for developing a novel item on its menu.

The uncertain scope of the term "research or experimental" activities also is illustrated by the treatment of computer software development. The process of developing computer software follows the hypothesis/trial-and-error process. A programmer will develop an idea for a program, and will attempt to incorporate the idea into the program. Once the program is written, it will be tested to determine if it performs adequately. If problems arise in the testing, the program will be revised to eliminate the problems. This trial-and-error process will continue until the program performs in a satisfactory manner.

Computer software is an area where revolutionary advances may be made to enhance productivity. Such revolutionary forms of software development are precisely the types of activity that the R&E tax credit was intended to encourage. But many taxpayers have asserted that the costs of developing all types of computer software should be eligible for the credit, including software relating to general management functions. We question whether the costs of developing all software should be eligible for the credit.

Our concern as to the treatment of computer software is based primarily on the growing importance of computers in our economy. Increasingly, computers perform tasks that historically were performed by hand. When instructions were written to guide people in the performance of these kinds of tasks, the cost of developing the instructions would not have qualified as research or experimental expenditures since they relate to general management functions rather than research or product development. Software is quite similar to non-computer based systems when it relates to such things as inventory control, accounting and similar management tasks. We question whether the costs incurred in developing such software should be eligible for the credit merely because the tasks are to be performed by computer and the instructions are incorporated into a software program.

We have three preliminary observations concerning the treatment of computer software development costs. First, software developed by a business for its own use generally is more likely to be managerial in focus, and the costs incurred in developing this type of software could be one category of software development that might be made ineligible for the credit. However, the costs of developing certain innovative in-house software should be creditable. For example, in the unusual case where a taxpayer performs basic research in computer science, i.e., it develops software that is not designed for a specific use in the taxpayer's trade or business, the development cost should be creditable. Similarly, the development of software to be used in computer-aided design and manufacture, which represents one of the most innovative areas of software development, should be creditable. Of course, software developed for use in R&E activities also should be creditable.

Second, "custom designed" software, i.e., software developed for a specific user, should be treated in the same manner as software developed for in-house use. Third, software developed for resale to the general public without significant case-by-case modifications generally should be eligible for the credit to the same extent that the costs of developing new products other than software would be creditable. Even with respect to these types of software, however, it might be appropriate to separate the costs of devising the non-computer based management or sales functions, such as accounting or financial management, which might not be eligible for the credit, from the costs of developing the software generally.

The problem of definition is magnified in the context of product modifications. Many product modifications involve little research or experimentation. For example, purely cosmetic and stylistic changes in products represent product modification, but have never been treated as research or experimentation for tax purposes. Consequently, these types of expenditures are not eligible for the credit. However, for many products stylistic changes cannot be totally divorced from functional changes. Changes in the design of an automobile body clearly have a stylistic component. However, the design of an automobile body also plays a functional role: it affects the aerodynamic efficiency of the car, which affects its fuel economy. As is evident, modifications to the body's design have a dual character.

It is quite difficult to determine the proper treatment of costs incurred in modifications having both stylistic and functional components. However, if the costs incurred in any product modification are treated as "qualified research expenses" when any functional change is made, as many taxpayers have asserted should be the case, then costs would be creditable that are primarily attributable to stylistic changes.

Effect of Inflation on the R&E Credit. The R&E tax credit generally is equal to 25 percent of the excess of the current year's qualified research expenses over the average of such expenses incurred in the three prior taxable years. The purpose of limiting the credit to the incremental expenditures was to target the credit to taxpayers who are expanding their research and experimentation efforts, thus providing an incentive for increasing R&E. A portion of the increases in expenditures will result from cost increases due to inflation rather than from an increase in the real level of R&E activity.

The effects of inflation on the R&E credit may be illustrated as follows: consider a business that incurs $1,000 of qualified research expenses in year 1, and increases its costs in subsequent years only to keep pace with increased costs. If costs increase by 10 percent per year, the qualified research expenses would be $1,100 in year 2, $1,210 in year 3 and $1,331 in year 4. The business' R&E credit for year 4 would equal 25 percent of the excess of the qualified research expenses for that year ($1,331) over the average amount of qualified research expenses for years 1 through 3 ($1,103). Consequently, this business would receive an R&E tax credit of $57. None of this credit is attributable to any real increase in R&E.

Based upon the preliminary data with respect to 1981 tax returns, we estimate that about 30 percent of the R&E credit claimed is attributable to the increase in R&E expenditures that result from inflation rather than from increases in real R&E activity. This percentage is much higher in the case of manufacturing companies outside of the high-tech fields. This effect will be reduced but not eliminated if the rate of inflation remains modest.

Start-up Companies. A substantial portion of the R&E credit claimed cannot be used currently. The postponement of the use of the R&E credit is particularly a problem for taxpayers that have recently begun operations. These taxpayers frequently undertake R&E activities that are at the cutting edge of technological innovation. A similar problem exists for other companies without taxable income. The R&E credit currently does not help these taxpayers. The result is to raise the cost of R&E for new corporations relative to established taxable companies that obtain the benefit of the credit currently. We will be examining whether the credit provision can be modified to extend the incentives of the credit to these worthy taxpayers.

Revenue Considerations

The revenue cost of the R&E tax credit is likely to be substantially in excess of the figure estimated in 1981. Our examination of the 1981 tax returns indicates that the credits claimed in 1981 totalled $0.6 billion, as compared to the 1981 estimate of $0.3 billion. Although our analysis is quite preliminary, we estimate the revenue loss in subsequent years to be about $1.0 billion per year.

Conclusions

The Treasury Department continues to support the R&E credit. However, we believe it can be made a more effective and efficient incentive for the performance of R&E. The types of activities that receive the credit should be better defined. In addition, it may be desirable to prevent increases in costs due to inflation from receiving the credit. We are developing specific recommendations on these issues, and we look forward to working with the Subcommittee to improve this important incentive for research and experimentation.

S. 1194 and S. 1195 Technology Education Assistance and Development Act; High Technology Research and Education Development ACt

Both S. 1194 and S. 1195 are designed to encourage research training and research endeavors at all levels of education. Section 2 of the bills would provide increased charitable deductions for contributions by corporations of computers and research equipment to schools and certain other institutions. Section 3 of the bills would modify the tax credit for research and experimentation provided by Code section 44F as it relates to contributions by corporate taxpayers to pay for basic research performed by colleges and universities and certain other research organizations. Finally, section 4 of the bills provides a special exclusion from gross income for amounts that graduate students in the sciences receive in the form of scholarships, grants and loan forgiveness under arrangements that require the students to perform teaching services. I will discuss each section of the bills separately.

Section 2: Contributions of Computers and Scientific Equipment and Related Services

Background

Under current law, as a general rule, a corporation may deduct, within certain limitations, the amount of cash or the fair market value of other property contributed to qualified charitable organizations. Limitations are imposed, however, with respect to contributions of ordinary income property -- property which, if sold, would yield ordinary income instead of capital gain. In the case of contributions of inventory, for example, the deduction is limited to the taxpayer's basis in the property, which is usually the amount it cost the taxpayer to manufacture or acquire the property in question. Similarly, the deductions for services contributed to charity is limited to the taxpayer's out-of-pocket cost of performing the services. In the case of contributions of property used in a taxpayer's trade or business, the allowable deduction is generally the fair market value of the donated property reduced by the amount of any depreciation which would be recaptured if the taxpayer sold the property.

There are currently two exceptions to the general rule applicable to gifts of ordinary income property. The first exception applies to corporate gifts of inventory to be used for the care of the ill, the needy, or infants, and is not considered further in this testimony. The second exception, which these bills would expand, involves corporate gifts of scientific equipment and apparatus to colleges and universities for research and experimentation.

To qualify for this second exception under current law, the property contributed must be tangible personal property which is of an inventory nature and which is constructed by the taxpayer no more than 2 years prior to the time of contribution. For this purpose, property is considered to have been constructed by the taxpayer only if parts manufactured by the taxpayer (or a related party) constitute at least 50 percent of the total cost of the parts used in the construction of the property. In addition, the property must be scientific equipment or apparatus substantially all of the use of which by the donee is for research or experimentation or for research training in the United States in the physical or biological sciences. If these and certain other criteria are met, the allowable deduction is equal to the taxpayer's basis in the property plus one-half of the excess of the value of the property over its basis (the unrealized appreciation), not to exceed twice the taxpayer's basis in the property contributed.

Description

Section 2 of S. 1194 and S. 1195 would expand the current exception to the ordinary income property rule in two ways. First, the exception would be made available for gifts of computer equipment and related services to primary and secondary schools and other centers of learning. Second, the current exception for gifts of scientific property to colleges and universities would be broadened.

Computer equipment and related services. The bills would provide corporations (other than subchapter S corporations, personal holding companies or certain service companies) increased deductions for contributions from the taxpayer's inventory to primary and secondary schools of computers and computer equipment. S. 1194 provides that this increased deduction also would be available in the case of qualifying gifts to certain libraries, museums and correctional institutions. The property must be manufactured within six months of the date of the contribution in order to come within this provision. The taxpayer also must provide training in the use of the contributed equipment. In addition, only equipment meeting certain technical specifications, and in the case of S. 1195, which retails for at least $250, will qualify for the deduction.

If these conditions are satisfied, the allowable deduction will be the sum of the taxpayer's basis in the computer property plus one-half of the unrealized appreciation in such property, not to exceed twice the taxpayer's basis in the property contributed. For purposes of computing this limitation, a taxpayer's basis in the property will include the cost of providing the required training to the employees of the recipient organization.

The bills also provide a special deduction for the value of service contracts provided with respect to contributed equipment. The amount of the allowable deduction for such qualifying services is equal to the lesser of the fair market value of the services or 150 percent of the cost of performing them. Related computer software transferred with the computer property also is deductible in an amount equal to its fair market value if purchased by the taxpayer or one half its value if developed by the taxpayer.

Scientific property. In the case of gifts of scientific property, S. 1194 and S. 1195 would broaden the current law provision in a number of significant respects.

First, the bills expand the type of property which qualifies for special treatment to include software and property which has been used in the taxpayer's trade or business as well as property manufactured for sale. In addition, taxpayers would be permitted a special deduction for service contracts issued in connection with any property contributed.

Second, the bills would expand the types of uses to which the property may be put by the recipient organizations. S. 1194 provides that, in addition to use in the physical and biological sciences, qualifying property also may be used for computer science education and the following categories of vocational education: computer and information services, science technologies, and precision production drafting and precision metalwork. S. 1195 provides that contributions may be made to secondary schools offering vocational education programs or to area vocational schools. In addition, S. 1195 provides that qualifying property may be used to provide education in computer science and in the operation of electronic and automated industrial, medical, and agricultural equipment.

Third, the bills would eliminate two troublesome aspects of the current provision dealing with gifts of scientific property. Presently, qualifying gifts are restricted to tangible personal property, which arguably excludes computer software. Both bills specify that computer software will qualify for the expanded deduction. In addition, the current law requirement that the contributed property must be manufactured by the taxpayer has prevented many taxpayers who subcontract some or all of the actual manufacturing from obtaining the benefits of the provision. S. 1194 relaxes this rule by providing that the property need only be assembled by the taxpayer in the ordinary course of its business of assembling and selling or leasing the same type of property. Alternatively, S. 1195 provides that, except in the case of software, the property contributed must be at least 50 percent assembled by the taxpayer.

The deduction granted by the bills for gifts of scientific property held in inventory is the same as under current law: the sum of the taxpayer's basis plus one-half of the unrealized appreciation in the property, not to exceed twice the basis of the contributed property. The deduction for contributions of property used in the taxpayer's trade or business would be 150 percent of the taxpayer's original basis in the property reduced by any adjustments required by section 1016 of the Code, regardless of the fair market value of the property.

Discussion

The Treasury Department generally opposes section 2 of S. 1194 and S. 1195.

These provisions of the bills would create a new open-ended expenditure program, funded by the Treasury but administered by private taxpayers, to place computers and scientific equipment in schools throughout the country. For example, if a taxpayer contributes inventory property which cost $1,000 to produce and which is worth $3,000, it would be entitled to a deduction of $2,000. This produces a tax benefit of slightly less than $1,000. In effect, the government would be purchasing the equipment at cost, but the taxpayer would decide who gets to use the equipment.

These bills allocate resources to a particular form of education at a time of general fiscal restraint, without determining whether this program is preferable to other worthy programs that cannot be funded. We recognize that the end result of having computers in every school may be highly desirable. But since taxpayers ultimately will bear virtually the entire cost of funding this program, we believe its desirability and effectiveness should be judged in the same manner as a direct appropriation for such a program. We thus question whether gifts of computers should be favored and gifts of books, for example, excluded; and whether gifts of repair services for computers should be preferred over gifts of doctors' services to hospitals.

In this regard, this Subcommittee should be aware that the combined effect of the specifications enumerated in the bills for qualifying computer equipment and the threshhold retail value of $250 required by S. 1195 will disqualify many of the computers sold on the market. For instance, both bills require that a qualifying computer have a capacity to use at least three languages and a memory capacity of at least 16,000 bytes, expandable to at least 48,000. Whether equipment with this type of capacity is necessary to teach basic computer literacy to elementary school children is questionable. Lower priced computers with less capacity may well be adequate for many educational purposes. In the context of this expenditure-type program, we seriously question provisions that require the acquisition of computers that may exceed the educational requirements of their users.

Under these bills, as discussed above, the direct tax benefits available to the donor shift most or all of the cost of the gift to the government. It is clear, however, that the companies that supply equipment to schools can and do anticipate receiving substantial commercial rewards in the form of future sales to schools and students' families. We question whether this commercial motivation should be preferentially rewarded through a purported charitable deduction.

We also foresee serious difficulties in administering the provisions contained in these bills. A significant potential for abuse lies in the fact that the amount of the deduction depends in large part on the fair market value of the equipment. Fair market value may be difficult to determine if the donated property is not selling well in the current economic climate or where technological advances have reduced its value. Moreover, the statute does not specify whether the wholesale or retail market is the appropriate measure of fair market value. If the government were to purchase directly the volume of equipment which the donors contemplate contributing under this bill, it would undoubtedly be entitled to a wholesale price. Thus, we would submit that the wholesale price would be the most appropriate measure of fair market value. We also believe that in many cases it will be quite difficult to determine what types of equipment and software should qualify for the special treatment provided. Finally, the basis of the contributed property may not be the appropriate measure of the taxpayer's costs of manufacturing products for purposes of determining the amount contributed to charity. In the high technology area, the cost included in the inventory to be contributed (which includes the relatively higher costs of the early units produced) may significantly exceed the marginal costs of producing the individual units contributed. In these cases, companies could actually make a profit under these bills by contributing inventory.

Additionally, we have four somewhat technical objections to section 2 of the bills. First, the special treatment accorded gifts of property used in a taxpayer's trade or business is unwarranted. The deduction is permitted for gifts of such property donated within three years of the time orginally placed in service and is equal to 150 percent of the taxpayer's original basis in the property less any required basis adjustments, regardless of value. Thus, a taxpayer who makes a "gift" of worthless three-year ACRS property can both depreciate it to zero and claim a charitable deduction for one-half its cost at the end of the three-year period. Needless to say, such a result is undesirable.

Second, we strongly object to the provision that permits a taxpayer contributing computer equipment to schools to increase his basis in the equipment by the cost of certain training services for purposes of computing the amount of the contribution deduction. The cost of these services is presumably also deductible as employee wages under section 162 of the Code. Thus, the effect of this special basis provision may permit a double or even triple deduction of the cost of the training, since the cost could be counted twice in determining a taxpayer's contribution deduction and also could be deducted under section 162.

Third and equally troubling is the provision which would permit taxpayers a deduction for the fair market value of purchased software contributed to schools and 50 percent of the fair market value of contributed software which the taxpayer developed. Since the amount of the deduction is unrelated to the basis of donated property, the value of the deduction could exceed the cost of the property. For example, assume a taxpayer pays $100,000 to purchase a program which it could sell to customers for $500. If the taxpayer contributed 1,000 copies of this program, it would be entitled to a deduction of $500,000. This would result in a tax benefit of approximately $250,000 as compared to a cost of only $100,000, yielding a $150,000 profit from this "charitable" giving. The same problem arises with respect to software developed by the taxpayer. Although only 50 percent of the value of the donated software may be deducted, taxpayers are permitted to expense most of the costs of developing software so that their after-tax investment in the software is about half the cost of purchased software. The tax benefits are roughly the same in both cases.

Fourth, the bills are unclear as to whether a special deduction for the cost of performing service contracts with respect to contributed property is to be allowable in the year the services are performed or in the year the property is contributed. We would strongly object to any rule which would permit a current deduction for expenses to be incurred in the future. Such a rule would overstate the true cost of the expense to the extent it fails to take into account the time value of money.

The bills do contain three provisions which modify current law and which we do not oppose. First, we understand that a gift of certain types of computer equipment is virtually worthless without a gift of the relevant software and that the cost of purchasing this software could be prohibitive. Assuming that Congress intended that the schools benefit fully from the receipt of computer equipment for research and training, then the gift of some software should qualify for the enhanced deduction. Whether all forms of software should qualify or only software that forms an integral part of the equipment donated to the school is a question which needs further consideration.

Second, the current law requirement that inventory must be manufactured by the taxpayer disqualifies many potential donors. We question whether Congress intended to disqualify all of these taxpayers and believe this provision should be reexamined. Third, the requirement that qualifying property be manufactured within six months of the date of contribution is an improvement over the current two-year rule, as it helps to ensure that schools will not receive technologically outdated equipment.

Section 3: Expansion of R&E Credit for University Research and Related Activities

Background

Section 44F of the Code provides a credit of 25 percent of the excess of any qualified research expense, including both in-house research expenses and contract research expenses, over the base period research expenses (generally the average of qualifying research expenditures incurred over the prior three taxable years). "Contract research expense" means 65 percent of any amount paid or incurred by the taxpayer to any person, other than an employee of the taxpayer, for qualified research. The credit for any amount of contract research expense paid in one taxable year for qualified research to be conducted in a subsequent taxable year is deferred until the taxable year in which the research is conducted. Section 44F(e) of the Code provides that 65 percent of any amount paid by a corporation to colleges and universities and other "qualified organizations" for basic research shall be treated as a contract research expense. The term "basic research" means any original investigation for the advancement of scientific knowledge not having a specific commercial objective, but it does not include research in the social sciences or humanities.

Amounts paid to colleges and universities by corporations for basic research are deductible by the corporation as a charitable contribution under section 170 of the Code. The proposed regulations under section 44F would include as basic research grants the taxpayer's basis in tangible property transferred to a qualified organization, even though the transferred property is scientific equipment for which an enhanced deduction is permitted under section 170.

Description

S. 1194 modifies section 44F(e) by providing that the term "contract research expense" includes 65 percent of amounts paid by corporations to certain qualified organizations for scientific education. The definition of qualified organization is expanded to include section 501(c)(3) organizations which are organized primarily to promote scientific research or education and which expend substantially all of their funds on a current basis for such purposes. The term "scientific education" means the education of students and faculty at an institution of higher learning in mathematics, computer science and physical and biological/biomedical sciences.

S. 1195 contains similar modifications and, in addition, would define a qualified organization to include an area vocational school. The definition of scientific education in S. 1195 also is broader than that in S. 1194 and would include instruction in the use of electronic and automated medical, industrial, and agricultural equipment and instrumentation.

Both bills provide that, to be eligible for the credit, the amounts contributed must be expended by the qualified organization for the payment of wages to faculty employees who are directly engaged in providing scientific education, or for funding scholarships or loans for students at the institution who are engaged in postgraduate study in mathematics, engineering or the sciences. Moreover, qualifying grants must be made pursuant to a written agreement obligating the donor to make contributions at least equal in amount in each of three consecutive years. S. 1194 includes a restriction that the amount of such grants available for the credit is the excess over the average of the amounts contributed during the prior three taxable years to similar educational organizations.

Both S. 1194 and S. 1195 would remove the limitation on prepaid contract research expenses qualifying under revised section 44F(e). Moreover, for purposes of determining the total amount of a taxpayer's research expenditures that qualify for the credit in any one year, those expenditures that qualify under section 44F(e) will not be included in the computation of base period research expenses.

Discussion

The Treasury Department supports the objective of section 3 of S. 1194 and S. 1195 to enhance education in the sciences and technology in the United States. However, we question the effectiveness and efficiency of these bills in achieving this objective. We would like to work with this Subcommittee to determine whether these bills can be modified to ensure their effectiveness.

We find particularly troublesome the provision which would disregard expenditures for college or university research and education in the computation of base period expenses. As long as a taxpayer's total other expenditures for qualified research are not reduced, this provision entitles the taxpayer to a credit for the full amount of its section 44F(e) expenses for basic research and scientific education whether or not such expenses increase or decrease in any taxable year. Under S. 1195, taxpayers who traditionally make donations to universities would be entitled to a credit for continuing their present practices so long as the universities agreed to use the amounts for scientific education. Moreover, increased donations may well not result in increased faculty salaries and scholarships. Since money is fungible and since the universities would have to fund their faculty salaries and scholarship expenditures in any event, money allocated to these purposes simply frees funds for other purposes. There is no requirement that the schools utilize the funds to hire additional faculty or to create new scholarships. Thus, the requirement that there be such an agreement as to the use of funds could be meaningless.

We also would like to take this opportunity to request that Congress clarify whether the credit for basic research expenditures under current law applies in the case of gifts of property to schools. Corporate taxpayers may currently take a deduction of up to twice the cost of producing scientific equipment contributed to schools and universities. If taxpayers also are permitted a credit for such gifts, they would actually earn a profit by making a "charitable" gift of inventory. We believe such a result is inappropriate, and that the credit should be limited to cash grants for basic research. While the subsidy is substantial in the case of cash gifts (62 cents for every dollar spent for basic research), the charitable motive of the gift is clear, since the taxpayer bears a significant portion of its cost.

Section 4: Modification of Exclusion from Gross Income for Scholarships, Grants and Loan Forgiveness

Section 4 of S.1194 and S.1195 would provide special rules for taxation of scholarships, fellowships and student loan cancellations for postgraduate degree candidates in mathematics, computer science (and, under S. 1195, computer applications), engineering, and the physical or biological sciences. The Treasury Department opposes section 4 of these two bills as currently drafted.

Background

Current law provides that amounts received as scholarships or fellowships are fully or partially excluded from gross income. The exclusion is restricted to educational grants made by relatively disinterested grantors who do not require any significant quid pro quo from the recipients. Payments to enable individuals to pursue studies or research are not considered to be scholarships or fellowship grants if the payments represent compensation for past, present or future employment services or if the studies or research are primarily for the benefit of the grantor. The purpose of these rules is to distinguish between payments made primarily to further the education of the recipient (excludable from gross income), and compensatory payments made primarily to reward or induce the recipient's performance of services for the benefit of the grantor (includable in gross income).

Although as a general rule scholarship awards conditioned on performance of future services are taxable to the recipient, there are several exceptions. Code section 117(c) provides a limited exclusion from income for Federal awards that pay for tuition and related expenses (but not for room and board) that are conditioned upon post-award services as a Federal employee (or in a health manpower shortage area). Section 117(c) does not apply to awards made by State or local governments, or to awards made by educational institutions.

There also are several temporary statutory exclusions from gross income applicable to specific scholarship programs that are conditioned upon future services. One of these is a temporary exclusion from income for National Research Service Awards (NRSAs) (P.L. 97-248, section 285). NRSAs are health research grants made by certain Federal agencies on the condition that the recipients engage in a period of post-award health research or teaching.

Student loan cancellations are not literally governed by the foregoing scholarship rules. Subject to certain exceptions, income from cancellation of indebtedness is included in a taxpayer's gross income (Code section 61(a)(12)). Cancellations of student loans, at least when the cancellation is not in the nature of a gift, would fall within this general rule. However, a temporary provision that expired on January 1, 1983 (P.L. 94-455, section 2117, as amended by P.L. 95-600, section 162), excluded from gross income cancellation of student loans if the loan cancellation was pursuant to an agreement that the loan would be discharged if the borrower worked for a minimum period of time in specified professions in specified geographical areas, or for specified classes of employers. It is our understanding that this provision primarily assisted public hospitals in the establishment of programs to train health care professionals.

Description

Section 4 of these bills would provide that amounts awarded to a postgraduate degree candidate in the eligible areas of study (whether in the form of a scholarship, fellowship or a "qualified student loan forgiveness") will be excludable from income even if the award or loan forgiveness is conditioned on the recipient's performance of future teaching services for an institution of higher education.1/ A qualified student loan forgiveness is a forgiveness of a student loan that was used to finance postgraduate study in enumerated scientific or engineering fields. The exclusion would apply only to the extent that the monies were used for qualified tuition and related expenses (but not for expenses such as room and board).2/ The remaining provisions of Section 4 are substantially the same as those generally applicable to scholarships under Code section 117.3/

Discussion

As a preliminary matter, while the cancellation of a student loan is not a scholarship or fellowship grant in form, we believe that the tax treatment of such cancellations should be determined under rules similar to those applicable to scholarships, since the same result could be achieved by making a grant to the borrower in an amount equal to the loan

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1/ The caption of paragraph (f) of Section 4 refers to a requirement of future teaching or research services. However, the text of the provision itself refers only to teaching services.

2/ Paragraphs (a) and (f) of Section 4 are in apparent conflict regarding the extent to which amounts received as a qualified loan forgiveness may be excluded from income if the student loan proceeds were used for educational expenses other than tuition and related expenses. The exclusion for qualified student loan forgivenesses (which by definition must be conditioned on future services) is set forth in paragraph (a). Paragraph (a) does not limit the exclusion to amounts used to pay for tuition and related expenses. Qualified student loan forgiveness also is discussed in paragraph (f). which does impose such a limit with respect to awards conditioned on the performance of future services. We interpret the limitations of paragraph (f) as being intended to override paragraph (a).

3/ The definition of a "qualified institution" of higher education used in Section 4 is similar to that set forth in Code section 117(c) (relating to certain Federal grants), except that the educational institution with respect to which an award is made, or for which teaching services are to be performed, need not be a public or nonprofit institution.

that is to be forgiven. As with traditional scholarships, the question then becomes whether the conditions on the cancellation of the loan are primarily for the benefit of the lender, in which case the cancellation or grant is more properly treated as taxable compensation than as a scholarship or fellowship.

Under Section 4, a student could exclude from income a "scholarship" award received from his university on the condition that he perform future services for the university as an employee. If instead of receiving a scholarship, the amount of the award had been paid to the student in the form of a higher salary when he became an employee, the additional salary would have been taxable income to him. This is so even if the additional salary were used to repay educational loans or otherwise to recoup the costs of obtaining a degree. The tax result should be the same if the compensation is paid to the student in the form of a "scholarship" on the condition that the student accept future employment. It would be unfair to require taxpayers who pay for their education out of after-tax income derived from post-education employment to be taxed more heavily than those who receive part of their compensation in the form of nontaxable "scholarship" awards conditioned on future employment.

The bill does not attempt to distinguish between awards that may produce direct benefits for the grantor and those that do not. An award from a grantor conditioned upon performance of future employment services for the grantor is clearly compensation and should be taxed as such. In contrast, a plausible argument can be made that no income should result from an award conditioned on future services for any of a broad class of employers chosen by the recipient, when there is no expectation that the recipient will become an employee of the grantor or of an institution affiliated with the grantor. Section 4 would treat both types of awards similarly, even though the former is clearly compensatory in nature.

Instead of a blanket exclusion for all awards conditioned on future teaching services, standards should be developed to identify which scholarship awards are not truly compensatory even though they impose some conditions on the recipient. Those standards should apply to students in all areas of study, not just students in the sciences. Treasury would be happy to work with the proponents of this legislation to develop the appropriate standards.

S.1147
Mortgage Debt Forgiveness Tax Act of 1983

S.1147 would amend the Internal Revenue Code retroactively to permit a taxpayer to exclude from his gross income (to the extent of the adjusted basis in his principal residence) discharge of indebtedness income realized with respect to certain "qualified mortgage indebtedness" and to reduce the basis in his principal residence by the amount of the discharge of indebtedness excluded from his income. Treasury cannot support this bill in its present form. We agree, however, that the Code should be amended to permit individuals to defer the recognition of income realized on the prepayment of a home mortgage loan at a discount if adequate safeguards against abuse can be devised.

Background

Under Code section 61(a)(12), a taxpayer-debtor generally realizes gross income when he satisfies his loan obligation at less than its face amount in an arms-length transaction. The amount of income equals the difference between the face amount and the amount paid in satisfaction of the debt. Code section 108 establishes three specific circumstances where such discharge of indebtedness income may be excluded from a taxpayer's gross income: (1) where the discharge occurs in a title 11 bankruptcy case, (2) where the discharge occurs when the taxpayer is insolvent, or (3) where the indebtedness discharged is certain business indebtedness with respect to which a solvent taxpayer elects to reduce the basis of his depreciable property.

Recently, in order to reduce the number of low interest loans in their portfolios, financial institutions have been offering discounts to mortgagors who prepay the balance of their loans. Under current law, a financially solvent homeowner must recognize taxable income when, pursuant to such an offer from a financial institution (other than one from which the taxpayer purchased his principal residence), he prepays the mortgage on his principal residence at a discount.4/ For example, if the principal balance of the mortgage were $20,000 and the taxpayer paid $18,000 in full payment of the mortgage, the taxpayer must recognize $2,000 of ordinary income from the discharge of indebtedness in that year.

4/ Rev. Rul. 82-202, 1982-48 I.R.B. 5.

S. 1147

S.1147 would establish a new statutory exception to the rule that discharge of indebtedness income is included in income currently. Under this new statutory exception, a financially solvent homeowner who realizes discharge of indebtedness income with respect to the mortgage on his principal residence would be required to exclude that income from taxation and to reduce his basis in such residence. S. 1147 only applies with respect to certain "qualified mortgage indebtedness," which is defined as indebtedness incurred by an individual in acquiring his principal residence or in making improvements to his principal residence, the cost of which is taken into account in determining his basis in the residence.

The amendments made by S. 1147 would apply retroactively to taxable years beginning after December 31, 1953. A special rule would waive the statute of limitations in order to allow credit or refund claims arising by reason of the amendments to be filed within one year of the date of enactment.

Discussion

By requiring a private homeowner to reduce the basis in his home with respect to discharge of indebtedness income realized on the prepayment of his mortgage, S. 1147 would permit the taxpayer to defer the recognition of the income until he recognizes gain on the sale of the residence. However, in most cases, the deferred income would escape taxation entirely. For example, by reason of the nonrecognition rule of Code section 1034, to the extent that the taxpayer reinvests the proceeds from the sale of his principal residence in a new principal residence, the gain on the sale (including the deferred discharge of indebtedness income) would not then be recognized. If the taxpayer were to sell his principal residence after he attained age 55, he could elect under Code section 121 to exclude from income up to $125,000 worth of the gain (including the deferred discharge of indebtedness income). If the taxpayer owns the residence at death, his heirs would receive the property with a basis equal to its fair market value and the deferred discharge of indebtedness income would then go untaxed.

Under present law, there are many other ways that a taxpayer can "cash out" the economic benefit of a low interest mortgage without incurring a current tax liability. For example, if the taxpayer prepays at a discount a purchase money mortgage provided by the seller of the property, Code section 108(e)(5) allows the taxpayer to reduce his purchase price (basis) for the property instead of recognizing discharge of indebtedness income. A homeowner also can obtain comparable economic benefits without current taxable income by refinancing the low interest mortgage with a second mortgage "wrapped around" the first mortgage. In this manner, the homeowner would be able to cash out the difference between the face amount and fair market value of the first mortgage in exchange for paying a higher interest rate on the second mortgage, without recognizing any taxable income currently.

Another way in which a taxpayer could realize the economic benefit of a low interest mortgage would be to sell his house subject to the existing mortgage (assuming there is no due on sale clause in the mortgage). Under such circumstances, the taxpayer would be able to increase the sales price for the house to reflect the fair market value of the favorable mortgage. As discussed previously, taxation of this amount of income may be deferred for a substantial period of time and may be exempt from tax. If this income is ever subject to tax, it would be taxed at capital gains rates.

In view of the above possibilities of obtaining comparable economic benefits with respect to a low interest mortgage in a variety of other ways, we recognize that there is some merit to the enactment of S. 1147.

Nevertheless, Treasury cannot support S. 1147 in its present form. The bill would apply retroactively to all taxable years beginning after December 31, 1953. Financial institutions have been offering discounts to mortgagors to prepay their low interest loans and some homeowners have accepted such offers with understanding that the income tax law requires discharge of indebtedness income to be recognized. We do not believe that such taxpayers should be accorded a windfall by the enactment of S. 1147.

In addition, we are concerned about the effect the enactment of S. 1147 would have in a compensation setting. For example, if an employer had loaned an employee money to purchase his principal residence, S. 1147, if enacted in its present form, may permit such employer to provide tax deferred (or as discussed previously, most likely tax exempt) compensation to the employee by forgiving all or a portion of the loan as a bonus.

For these reasons, Treasury cannot support S. 1147 in its present form. Nevertheless, we are willing to work with the Subcommittee in fashioning a narrower provision to provide appropriate relief to private homeowners who prepay their mortgage loans at a discount.

Senator **Danforth**. Now we have three different panels, one on S. 738, one on S. 1194 and S. 1195, and one on S. 1147. There are a total of 11 people testifying on these panels. Any written testimony will be included in the record in its entirety. But if we could keep the individual testimony to 5 minutes each, it would be greatly appreciated, and you can summarize your full statement for the record.

The first panel on S. 738, Messrs. Moore, Arnold, Considine, and McCrea.

Mr. Moore?

STATEMENT OF WILLIAM G. MOORE, JR., PRESIDENT AND CHIEF EXECUTIVE OFFICER, RECOGNITION EQUIPMENT, INC., DALLAS, TEX., ON BEHALF OF AMERICAN ELECTRONICS ASSOCIATION, WASHINGTON, D.C.

Mr. **Moore**. Yes, sir. Senator, first of all, I come here not as an expert witness but rather as a company president. I am also on my maiden voyage in terms of ever testifying before a group like this, so I preface my remarks with that.

What I would like to do is I have submitted about 30 pages of testimony which has a lot of statistical data. I would like to use my 5 minutes to flavor that testimony if I can with some personal observations on the state of the high tech business and the effect of the legislation that you and Senator Bentsen are sponsoring. I propose to do that.

First of all, representing, as I do, the American Electronics Association, as well, I want to thank the administration and express our pleasure at the extension of the sunset provision, although we will gladly work with them for the total elimination of that provision and any other definitive things that have to be done under that legislation.

If I may, my background. I am currently president and chief executive officer of Recognition Equipment, which is located in an area now becoming Silicon Gulch out in the Dallas/Fort Worth area. Prior to joining Recognition Equipment, I was vice president for computer operations for the Perkin-Elmer Corp. out of Connecticut, and began my computer career about 15 years ago at Bell Laboratories, in New Jersey.

In supporting the legislation, S. 1194 and S. 1195, a couple of things come to mind that I want to reinforce. One is that we simply do not today have enough engineers and computer scientists to do the amount of R&D that we want to do. In that effect, S. 738 was a piece of lynchpin legislation that we desparately need. The problem, since there is some confusion, I think, deserves repeating. The problem is not that we do not have qualified graduates from high schools and colleges to go on to further education. The problem is we do not have enough space in the classroom to accommodate these people.

In addition to that, we do not have state of the art equipment in the colleges and universities to provide the necessary research and development and educational environment for these students, assuming we could fit them into the classroom and begin to accommodate those who want to be engineers or computer scientists. We recognize that the high tech industry must play a role. Again it is our inclination to ask the administration and to ask the House and the Senate merely to provide an environment of fertility where, in fact, we can grow this business and do a number of things that would help in the area of computer literacy.

Computer literacy is probably the most significant buzz word in our industry today. It is the ability of someone to use and understand the basic computer concepts, everything from interfacing a terminal in a work environment to designing computer systems, both hardware and software. The only way that I know of to achieve computer literacy is to achieve it through hands on use of computers, computing equipment and the various software programs and packages that go with that.

In terms of the research and development orientation of our industry, my company routinely spends between 14 and 18 percent of its annual revenues on R&D, which is a fairly high number. Most of the companies in our industry spend at least 8 to 10 percent on an ongoing basis in this area.

We are facing ferocious international competition as well, where the cost of money is one of the biggest problems we face competitively. It is not only Japan, about which we have heard a lot, it is also France, Germany, United Kingdom, Singapore, et cetera. So any environmental conditioning that makes more money available to us in this international competition is a very positive factor.

A couple of other comments about what we see. Almost all of my contemporaries in the American Electronics Association and people with whom I deal see a definite sign of the pick up of the economic climate in the United States. There is also some minor sign that we may be seeing some pick up in Western Europe. We have seen also in our industry a very high level of initial public offerings of brand new computer companies, none of whom today take advantage of the various R&D provisions or are in a position today necessarily to donate equipment and services but will very quickly.

Finally, after having spent a week up here talking to Members of the House and the Senate, I am extremely encouraged very frankly at the level of sensitivity and awareness you have to the problem, and personally want to thank vou for your sponsoring legislation.

Senator **Danforth**. Thank you, sir.

Mr. Arnold?

[The prepared written statement of Mr. Moore follows:]

Statement of William G. Moore, Jr.
President and CEO of
Recognition Equipment, Inc.
for the American Electronics Association
Before the
UNITED STATES SENATE COMMITTEE ON FINANCE
Subcommittee on Taxation and Debt Management
May 27, 1983

Mr. Chairman and Members of this Distinguished Committee:

My name is Bill Moore. I am President and CEO of Recognition Equipment, Inc., a company which manufactures optical character recognition systems. The company, headquartered in Dallas, Texas, was founded in 1961 and currently employs some 1900 people. I was formerly Vice President for Computer Operations at Perkin-Elmer. I started my computer career fifteen years ago at Bell Laboratories.

I am a member of the Board of Directors of the American Electronics Association (AEA) and appear before you today on behalf of that organization. AEA represents over 2,000 growing high technology companies throughout the country. The Association's membership includes all segments of the U.S. electronics industry, including computer, telecommunications, defense, instruments, semiconductors, software, research, and office systems. While AEA numbers among its members many of the largest electronics manufacturers, nearly three quarters of its companies are relatively young, fast growing businesses currently employing fewer than 250 people. In aggregate, AEA companies employ over 1,250,000 Americans.

ELECTRONICS--ONE KEY TO ECONOMIC VITALITY

The electronics and information technology companies are major contributors to the industrial development of the United States through the creation of jobs within the industry itself, through the "multiplier effect" at work in the service and other economic sectors, and through the improvement of the productivity of American basic industries. These same technology companies are also key resources in the national defense.

The electronics industry has had a phenomenal growth rate of 17 percent over the last decade. It currently ranks tenth among U.S. industry categories and is expected to rank second by the end of the century.[1] Sales of the top 100 electronics companies increased 46 percent between 1979 and 1981. Export sales totalled over $25 billion in 1982. This growth is reflected in the creation of a substantial number of U.S. jobs within the industry. Additionally, the electronics and information technology sector is a bright spot in the continuing creation of innovative and entrepreneurial new companies which have proven the major source of economic growth in the U.S. economy.

U.S. COMPETITIVENESS TIED TO R&D

I am pleased to be invited here today to comment specifically on the technical education issues addressed by Senator Danforth's S.1194 and Senator Bentsen's and Chafee's S.1195. I am aware that others present will speak competently in support of S.738, a bill introduced by Senator Danforth to eliminate the sunset of the R&D tax credit. However, because AEA is one of the foremost proponents of the need for permanence of the R&D tax credit and because the long-term success of S.1195 and S.1194 is so intrinsically tied to such action, I would like to note AEA's strong support for S.738 as well. Indeed, without a continuing R&D tax credit, the impact of S.1194 and S.1195 will be lost.

Technological leadership is this nation's single most important national resource. It is indispensable to the long term growth of our domestic economy, to U.S. competitiveness in world markets and to a strong national defense. This technological advantage, however, is being challenged today as never before.

Twenty-seven years ago when the Soviets sent the first satellite into space, the U.S. responded with a major new commitment to accelerate science and technology. Equally important was the enlightened support for science education that accompanied our space effort. There followed two golden decades of technological development based on a robust partnership between industry, education, and government.

U.S.--A TECHNOLOGY BASED SOCIETY

Government sponsored basic research led to the development of key technological innovations--in semiconductors, computers, and telecommunications, etc;--that have changed the way the world thinks and conducts business. America's economy has been transformed over the last 20 years from a manufacturing to a non-manufacturing base. Labor-intensive production is increasingly replaced by processes that rely on new technologies--on brainpower rather than musclepower.

Just a generation ago, traditional industries such as agriculture, automobiles, and textiles accounted for more than half of our nation's exports and a quarter of our jobs. During this last generation, however, 9 out of every 10 new jobs created has been in the information and services areas. In 1981 a U.S. Commerce Department report showed that information technology accounts for 46 percent of the GNP and computer sales alone bring a $6 billion balance of trade surplus.

HIGH TECHNOLOGY CREATES JOBS

While high technology should not be expected to provide the single answer to America's economic vitality, it acts as a key engine of economic growth in three primary ways.

First, if they can secure enough engineers and other scientific and technical personnel, electronics manufacturers will continue to expand and create many new jobs directly within the industry itself. A recently completed AEA study, covering 815 member company respondents (about one-third the entire U.S. electronics industry), projects growth in both technical and non-technical electronics employment of 46 percent through 1987. The Bureau of Labor Statistics, historically conservative in predicting trends in high tech sectors, projects a similar pattern. By 1990 the fastest growing employment sectors in this industry will be: office equipment, computers, peripheral equipment and medical systems. Electrical engineering jobs are projected to increase by 150,000.

Second, although the high technology producers alone account directly for only a moderate percentage of the total new jobs in the economy, they will indirectly account for a significantly larger proportion of new employment in service and related fields. In California, for example, state planners predict that because of this "multiplier effect", high tech employment will account for 40 percent of the total primary, secondary, and tertiary job growth in the state by the end of the decade.

Third, applied electronics will strengthen our traditional industries, helping maintain jobs, contributing to job growth and to absorption of displaced workers. The majority of jobs will come about through these "users" of high technology processes and products to increase productivity and innovation. Management expert Peter Drucker estimates that some 10 million manufacturing jobs today may be lost by 1990 due to outdated production processes and foreign competition. High tech will act as a partner with our traditional industries to help them remain competitive in historical markets, thereby preserving and expanding American jobs.

R&D RELATES TO JOB CREATION AND PRODUCTIVITY

R&D expenditures directly relate to job creation. Between 1972 and 1978 new products developed and marketed, for example, accounted for three-quarters of the job growth in high growth industries--at double the rate for other U.S. manufacturing segments.

And the correlation between R&D and productivity is graphically demonstrated by a sliding downhill trend: from a fairly consistent 3 percent productivity growth between 1948 to 1973, years when U.S. R&D spending was high, to a low of .8 to 1 percent after 1973, reflecting several years of decreased R&D expenditures. From 1964 to 1978 R&D as a share of U.S. GNP plunged from almost 3 percent to 2.24 percent in 1978. In 1981--before passage of the ERTA R&D tax credit--it stood at 2.39 percent of the GNP--a 20 percent decrease over the pattern of the 1960s.

NEED FOR PERMANENT R&D TAX CREDIT

Permanence of the ERTA R&D tax credit is essential if high technology is to remain competitive in both U.S. and world markets. Designed to stimulate investment, the R&D credit constitutes what AEA companies regard as a major breakthrough in U.S. tax policy. It signaled the Federal Government's interest in encouraging increased private research (including university research).

Premature assessments cause some to maintain that industry is not using the credit or that results, when the credit is used, do not warrant taxpayer costs. It is true that some cautious companies have not acted yet. Enacted for only 4 1/2 years, the start-up of the credit has occurred in the middle of an economic recession, a time when budget constraints and careful management limited may companies' R&D expansion. In addition, the existence of the five year sunset provision has also been a disincentive to those who know that R&D is not as beneficial in the short-term but reaps success only after sustained long-term financial commitments. And finally, some companies have not acted simply because of tne slowness of the regulations to be written and adopted.

Evidence shows, however, that others are aggressively investing. A new McGraw-Hill report, "Annual Summary of R&D Expenditures for 1982," shows that high tech electronics firms increased R&D expenditures in 1982 between 16.1 and 23.2 percent over 1981. The survey report also indicates that these same companies intend to increase their R&D expenses in 1985 between 29.6 and 46.3 percent over those for 1982.[2] A typical AEA company spends between 8 percent and 14 percent of its total revenues annually on research and development.

The R&D credit is a prime stimulus to increased investment. Spokesmen for Digital Equipment Corporation maintain that their company's R&D expenditures have risen 38 percent in absolute dollars, or from 8 percent of revenues in 1981 to 11 percent in 1982. These increases have been motivated not only by strategic positioning but by the availability of the tax credit. Both Burroughs and 3M increased their R&D expenditures substantially and maintain that the tax credit was a primary incentive. Burroughs Vice-President of Finance, James Unruh, suggests that the phaseout of the R&D tax credit might cause his company to "rethink a project's merits."[3]

I would also like to call your attention to the key paragraphs of a statement before this Committee today from a witness the schedule was not able to accommodate in person. John R. Colbert, Treasurer of M/A-Com Inc. of Burlington, Massachusetts. Here is an excellent illustration of how the R&D credit fits into and expands the R&D planning of a technology company:

> Mr. Chairman, we appreciate that the question before the committee is: "Does the R&D tax credit work? Does it encourage companies to undertake research and development efforts which it would not otherwise undertake?" The answer from M/A-Com is a resounding "Yes!!"
>
> The credit has been in effect for only two years; yet in that time it has become embedded in the thinking of our company's senior management, and has had the effect of heightening the corporate priority for research. Of course, M/A-Com will perform research and development activities regardless of the presence or absence of the credit, but that is not the question. What has happened is that a "tilt" has been created in favor of expanding our effort at a more rapid rate, just as you intended when you enacted the credit. It is too soon yet, and in fact may never be possible to draw a direct correlation between the dollars we recovered through the credit and the additional dollars we spent on R&D. I can, however, offer some specific observations on particular M/A-Com R&D efforts which were affected by the credit.

> Since the credit was enacted, M/A-Com has made the decision to intensify its research in gallium arsenide (GaAs), a material which could be used with or in place of silicon in semiconductor components. Within the last year, we have made the commitment to acquire a $20 million facility to house this research and the manufacturing that results, and we will, of course, equip and populate it to the tune of many millions more. The presence of the credit made it much easier for us to commit to this level of effort, even though it represents an outlay far in excess of any we could expect to recover from the credit for years to come.
>
> This program illustrates the effect of the credit on our corporate thinking; it also represents the difficulty of making a direct correlation between the credit and a given effort. Our GaAs effort is a long-term program. Decisions we make today will influence our company for decades to come. With that in mind, it is obvious that no such decision is made solely on the basis of the credit. On the other hand, this investment represents a major risk of assets for us. The willingness of the government to recognize that risk through the credit is no small factor in our willingness to undertake it.
>
> There is one thing I should mention about GaAs. It represents one of the technological areas in which the United States does not enjoy clear technological superiority over our trading partners, including Japan. Perhaps the safe play for us would be to stay in an area where we already have the head start. By participating vigorously in an area of international technological competition in which the outcome is not assured, we multiply our risk. We believe that this is precisely what you wanted us to do when you enacted the credit, and we are doing it.

To allow the R&D tax credit to work most effectively, and to enable corporate planners to look to the longer term, the sunset provision needs to be eliminated now. We hope this committee will so concur. For the revenue costs incurred, the return on investment in the form of substantial improvement in productivity and competitiveness of U.S. companies in increasingly demanding international markets is clearly justified.

R&D AS A WAY TO STRENGTHEN EDUCATION AND RESEARCH

High technology's ability to fulfill its promise as a creator of new markets and as a partner with traditional industries is predicated on the availability of highly skilled human resources specifically electrical and electronic engineers (EE's) and computer engineers (CE's) and technicians.

AEA's report "Technical Employment Projections: 1983-1987" indicates a need by 1987 for 63.1 percent more electronic technicians, 65.5 percent more electrical/electronic engineers, 115 percent more computer (software) engineers, 102.5 percent more computer analyst/programmers, and 107 percent additional electronic engineering technologists. And in spite of what one reads about mechanization, there continues to be a healthy projected need for 63.7 percent more assemblers. (See Attachments A and B).[4]

Extrapolating the projected needs for EE and computer engineers to the entire U.S. electronics industry and juxtaposing them against the projected supply from U.S. colleges and universities, we get a trend-shortfall of some 20,000 a year. Sixteen percent of the industry projections are based on successful receiving of defense contracts. However, even assuming no defense contracts, annual EE/CS engineer shortfall is projected to be over 16,000.

The need for EE and Computer engineers, in spite of recent economic conditions, remains significant, as evidenced by unemployment figures. In 1981, unemployment for computer specialists and electrical engineers stood at a scant 1 percent, virtually full employment. (See Attachment D). Yet, in spite of the enormous growth of the electronics and information technology industries over the last decade, the production of EE bachelor degrees has increased by only 29 percent.

PLENTIFUL SUPPLY OF UNDERGRADUATE APPLICANTS

The problem of increasing the supply of BS/EE's and BS/CE's is not a lack of qualified or interested undergraduates. The difficulty is, to a large extent, based on the shortage of faculty, facilities and equipment. Members from the academic community serving on AEA's Blue Ribbon Committee on Engineering Education--Dr. Joseph Pettit, President of Georgia Institute of Technology; Dr. Karl Willenbrock, Green Professor of Engineering at Southern Methodist University; and Dr. Richard Atkinson, former Executive Director of NSF and now Chancellor for the University of California, San Diego--estimate that two out of every three qualified applicants to undergraduate electrical/electronic and computer engineering programs cannot presently gain admittance.

Students at the University of Illinois, Champaign-Urbana, for example, must score at or above the 97 percentile on entrance exams to be admitted to engineering programs. At Cal Poly, San Luis Obispo, a student with a 3.7 GPA on a 4.0 scale is occasionally admitted but classified as "educationally handicapped." Most colleges are now limiting, capping, or cutting back enrollments. Many have been forced to raise admission requirements substantially. Most have increased class sizes to a point where the quality of education is impacted. From 1980 to 1981, 31 percent fewer engineering programs were given normal six-year accreditation. During this same period, 71 percent more engineering schools were asked to "show cause" why accreditation should not be terminated than have been asked to do so historically.

Once these capable engineering students are turned away, they are generally also lost to other disciplines. San Jose State University calculates it has 1,000 students "holding" in other disciplines, waiting for engineering slots to open. Yet, currently a 33 percent technical and engineering faculty vacancy rate exists, making it likely that these students will have to continue on through the non-technical major pipeline. Neither the industry nor the country can afford to lose them. This is especially true when one considers demographics which indicate that for every four 16 year olds we have today, we will have only three by 1990. And more of these three will be females and minorities--two groups that have historically avoided courses and careers in, math, science and engineering.

FACULTY SHORTAGES A MAJOR CAUSE

As mentioned, faculty shortages constitute a major bottleneck in the production of new engineering and high technology personnel. Currently, 10 percent (or some 2,000) engineering faculty positions are vacant; half have been vacant for over a year. Vacancies approach 50 percent in some high tech specialty areas, such as solid state, digital systems and computer engineering. This country needs 1,000 new engineering faculty each year through 1990 just to remain constant. Yet, we are producing only 450 annually.

CAUSE OF THE FACULTY SHORTAGE

While many students want to study undergraduate engineering, few U.S. citizens want to continue on for doctorate degrees in order to teach. Two factors serve as primary disincentives: low academic salaries compared with those offered by industry and inadequate teaching and research labs.

INADEQUATE FACULTY SALARIES

There is virtually no incentive today for a U.S. citizen with a bachelor's degree in electrical or computer engineering to go on for four-to-six years of costly graduate study in order to teach for a salary that begins between $19,000 and $26,000. The same student can go immediately with a bachelor's degree into industry at an annual salary between $23,000 and $29,000. And should a student continue on to receive a doctorate degree, choosing between the starting professor's salary and one ranging up to $35,000 in industry is usually an easy decision. A recent study of Southwest colleges shows that engineering faculty members who left academia for industry raised their salaries an average of $13,588 or 55 percent.

S.1194 and S.1195 address the problem of inadequate faculty salaries. Extending the R&D tax credit to encourage private industry to augment faculty salaries will provide significant immediate assistance in dealing with the problem of faculty vacancies. In addition, the bills' requirement for a three year commitment by the donor provides for a stable situation whereby universities can do effective recruitment and budgetary planning.

INADEQUATE LABORATORY EQUIPMENT

In addition to low academic salaries, inadequate teaching and research laboratories make engineering professorships unattractive. A study conducted last year by the National Society of Professional Engineers placed the cost of modernizing and expanding engineering laboratories just up to the 1971 student level at $1,238,250. Considering that enrollments have almost doubled since a decade ago, to bring instructional labs up to the needs of students today places the price tag in the $2 billion range.[5] This sorry situation is a result of steadily declining budgets for capital expenditures.

For example, at the California State University and College system, funding for replacement of instructional equipment in engineering is less than 2% annually of its replacing costs, requiring a 59 year life cycle to complete the replacement process. In Texas, State Senator Caperton recently introduced a bill in the state legislature to set up a $67 million fund for the purchase of engineering equipment to revitalize the State's engineering colleges and universities. Because technology is changing so rapidly within the industry --robotics, microelectronics, computer aided design, optics, spectrographics--many University laboratories are becoming so obsolescent that the technological future of the country is at risk.

Although a number of companies are already donating equipment to the college and school system, S.1195 and S.1194 recognize the need for additional private industry assistance in refurbishing U.S. education and research laboratories. The tax enhancements of these bills relating to scientific equipment donations for instructional use will act as incentives for manufacturers to invest capital equipment in the education and training of the U.S. technical workforce. The provision for donation of used equipment up to three years of age will be especially helpful to colleges where equipment is now all too commonly 15 to 20 years old. As the president of one Fortune 500 company remarked after a recent tour of a university engineering department, "The only time my engineers will see equipment of this type is when they tour the Smithsonian."

INCLUSION OF COMMUNITY COLLEGES AND VOCATIONAL COURSES

The problems of our four year institutions also exist at our U.S. community colleges: too few qualified instructors and outdated laboratory equipment, but an abundance of interested students. A 1983 survey of the California Community Colleges found that in engineering and electronic technology programs alone an estimated $20 million is needed to bring instructional laboratories up to a quality standard.

Inclusion of community colleges and certain vocational subject areas in S.1194 and S.1195 underscores the recognition by Senators Danforth, Bentsen and Chafee of the need the country has for trained technicians and service personnel. These institutions not only "feed" into four year colleges and universities, requiring parallel kinds of quality instructional capability, but they are commonly the first and last training grounds for the majority of entry-level employment, retraining, and upgrading for most of our country's workers.

NEW COMPUTER DONATIONS FOR K-12

In "A Nation at Risk: The Imperative for Education Reform," the recently released report of the National Commission on Excellence in Education, the quality of teaching in our public schools is viewed as woefully inadequate:

> "For the first time in the history of our country, the educational skills of one generation will not surpass--will not even equal--will not even approach, those of our parents."[6]

The great educational heydey of post-Sputnik has been lost, "leaving a generation of young people ill-prepared for the new era of technology and global competition." The report concludes that "our very future as a Nation and as a people" is at risk.[7]

As producers of electronics products we have special cause for concern. These K-12 grade students are our future employees. Industry's and our nation's competitiveness will depend on them in the very near future.

Xerox Corporation estimates that 60 million U.S. workers will be linked to some form of "electronic work station" (using computers, video screens, and telephone lines) by 1990.[8] Predictions from the National Center for Education Statistics are no less disheartening. They assert that unless the declines in math, science, reading, and writing skills of K-12 can be turned around, the U.S. in the next decade will produce 1 to 2 million of the 2.4 million high school graduates who will lack basic entry-level skills for jobs.

This situation comes at a time when 48 percent of the teaching positions in math are either vacant or filled by uncertified teachers [9] and when there are less than 10,000 physics teachers in the nation's 15,000 school districts. The U.S. currently lags fourth in scientific literacy behind the Soviet Union, West Germany, and Japan. Since 1969, graduating high school seniors taking college preparatory courses have dropped by one-third to 36 percent. Less than one in ten U.S. high school students take a one-year physics course. In the United States, 20 percent do not graduate from high school compared with 2 percent in the Soviet Union and 10 percent in Japan.

S.1194 and S.1195, by providing extension of tax enhancement for donations of new computers, educational software, and teacher orientation to elementary and secondary schools will help remedy this critical and pressing national problem.

NEED FOR COMPUTERS IN K-12 SIGNIFICANT

Currently, only one out of three U.S. public schools has access to a computer.[10] Twenty-two percent of the nation's 50,000 elementary and 60 percent of the nation's 25,000 high schools now have access to microcomputers.[11]

Industry sources estimate that the actual number of classroom computers available nationwide is only around 300,000--far too few to provide any substantive hands-on computer experience to the 37.5 million K-12 students. Last year's data validates this: only 13 percent (or 4.7 million) students logged an average of 9 hours of actual keyboard time during the 1981-82 school year.[12]

At the elementary level, the situation is worse. One third of the U.S. elementary school population gets 5 to 10 minutes of time on a computer each week.[13]

Against this unsatisfactory record, we need to remind ourselves that computer use by the education community has three primary benefits:

First, applications of computers helps to make students "computer literate" so that they can understand and function competently as adults in a society that will increasingly use technology in all aspects of daily life. Second, computer use will help students operate and be comfortable with electronic processes in the workplace--whether they go on to become highly educated engineers or secretaries using word processors and electronic mail. Third, at a time when a shortage of math and science teachers is extreme, computers offer a means to supplement classroom instruction in all disciplines. Through simulations and educational games, for example, students can be assisted not only to assimilate new information, but can be taught to think creatively and analytically.

The need is clearly demonstrated. For instance, one company in our Association has received 4,000 letters from schools describing a need for computers and a lack of funds to purchase and apply them. Many of member firms have received letters from schools which wanted to implement "computer awareness programs" because students were demanding them. Again, few of these schools were budgeted to buy computers to them.

Provisions for K-12 computer donations in S.1194 and S.1195 will provide incentives for companies to donate state-of-the-art and slightly used equipment in amounts we believe will help make a major impact on the problem.

INCLUSION OF SERVICE CONTRACTS AND WARRANTIES

The inclusion of service contracts as "eligible services" in S.1194 and S.1195 shows an enlightened perspective on the current state of university and pre-college school budgets. AEA itself has an active program through its Electronics Education Foundation to stimulate the flow of company resources--cash, grants, equipment, fellowship/loans--to universities. Cutbacks in education budgets are increasingly preventing our participating universities from accepting gifts of computers or CAD/CAM systems simply because these institutions do not have the money to pay for normal service and upkeep. Donation of normal warranty and service contracts for maintenance, repair, reconditioning, or services similar to those ordinarily provided by the company in a sale or lease will ensure that colleges and elementary and secondary schools receive instructional equipment which is immediately usable and serviceable for a reasonable period of time.

DONATION OF COMPUTER SOFTWARE

A recent article in the Wall Street Journal outlined the problem many K-12 schools were having finding money to purchase computer software to operate donated computer hardware. In many cases, schools have purchased computer terminals, but have failed to provide funds to buy software programs to operate them and sufficient courseware with which to teach meaningfully.[14] Provisions in the Bentsen-Chafee and Danforth bills to encourage companies to donate educational software will help to ensure that the computer hardware will be usable as soon as received--a "turnkey" kind of system.

ORIENTATION OR IN-SERVICE TRAINING

Only 11.2 percent of the nation's K-12 public school teachers actually use computers to teach students.[15] It is in the interest of any company donor to ensure that donated equipment is fully and effectively used. In-service training as required in S.1194 and S.1195 simply ensures that teachers become capable of operating the computer and associated software/courseware--and are able teach others to do so. The stipulation that the company donor and the school recipient work out an agreement relative to the number of orientation hours to be provided appropriately recognizes the diversity of computer-based systems that may be donated and the range of needs within the educational community.

INCLUSION OF FELLOWSHIP-LOANS FOR GRADUATE STUDENTS

Unless significant action occurs, our universities will lack the faculty to teach students how to use laboratory and research equipment. Fewer and fewer U.S. students are interested in teaching careers in engineering. The student doctoral pool from which faculty traditionally are drawn is shrinking. EE doctorate degrees have dropped by 39 percent--from 899 Ph.D/EE's in 1971 to 542 Ph.D/EEs in 1982. Computer engineer doctorate degrees awarded in 1982 were lower than those given six years ago and actually declined 19 percent over 1981--from 171 Ph.D/CEs in 1981 to 129 Ph.D/CEs in 1982.

Fifty percent of the doctorates awarded went to foreign students, two-thirds of whom are likely to return to their homelands after graduation. Currently, most applicants for entry level engineering faculty positions are foreign-born nationals. Twenty-five percent of all junior engineering faculty in the U.S. today received their bachelor degrees from non-U.S. universities.

As mentioned above, for U.S. citizens, the cost of graduate education is almost always too high for the payoff of a teaching salary at the end of the doctorate. The provision in S.1194 and S.1195 to encourage companies to provide fellowships and loans--the latter forgiven if the graduate teaches for a stipulated period of time--will go far to stimulate the interest of bachelor-degreed students to continue their studies. The provision to exempt from taxable income such gifts where they are given with a requirement to teach enhances the likelihood that the graduate will willingly enter the teaching profession.

ELIMINATION OF THE ROLLING BASE FOR EDUCATIONAL DONATIONS

The case has been stated previously for the need for increased basic research in the United States. During the 1960's industry spent 7% of every research dollar on basic research. Today it spends only 3.6 percent. Less than 15 percent of all R&D is done at U.S. universities compared to 20 percent in Japan. Industry currently accounts for only 3 percent of R&D dollars brought to universities, down from 11 percent in the 1950's. Yet basic research at universities--unlike the more proprietary nature of R&D conducted in-house by a single company--encourages technological transfer which benefits many. University R&D needs to be encouraged.

By eliminating the rolling payment for qualified basic research and scientific education from base period research expenses, S.1194 and S.1195 will stimulate and draw industry's attention toward universities. This augments the likelihood of increased dollars being translated into faculty salaries, graduate student fellowships, and equipment. Furthermore, it increases favorable outcomes in the development of innovative new products, new markets, and new jobs.

PRIVATE INDUSTRY WILLING TO HELP

The American Electronics Association has had an active national program to redress the shortage of technical personnel since 1981. Key elements of its efforts include:

- A standard of 2 percent of each company's R&D to be given to engineering education.

- Establishment of industry committees in states and regions to raise funds, work with state legislatures and universities to improve technical education budgets and programs. Those established to date are in: Washington, Oregon, San Francisco, Los Angeles, Santa Barbara, Orange County, San Diego, Texas, and Massachusetts. Additional ones are forming in New Jersey, New York, Connecticut, Minnesota, Arizona, and Colorado.

- Establishment of an Electronics Education Foundation. Over $2 million has been pledged to date to fund fellowship-loans, to augment faculty salaries, to service and purchase equipment. Another $100 million has been stimulated directly from AEA members to universities.

- Active involvement with federal and state legislation which addresses technical education issues, primarily through policies which encourage partnerships between government, industry, and the educational through tax incentives, and other jointly leveraged measures.

ROLE OF THE FEDERAL GOVERNMENT

We believe the federal government cannot force technological leadership. Government can, however, foster it through a strong national commitment to basic research and the creation of an educational system which provides for the education and training of adequate numbers of engineering and scientific human capital.

We are pleased to have the opportunity to express our strong support for S.1194 and S.1195. These bills constitute examples of cornerstone legislation that will help restore this country's technological and economic leadership. We support the underlying principal of this legislation--government-industry partnerships--which provides our schools and colleges with a financial multiple of the benefits which could be expected from a direct expenditure of the same amount of public funds. Furthermore, it does so with a minimum of the overhead and bureaucratic costs involved in federal grant programs. When we consider the procurement systems that would be needed to locate, purchase and place appropriate equipment, software and services as well as to establish R&D programs and faculty/student awards, it is obvious to us that the tax incentive approach in your bill is much simpler and efficient.

We commend Senators Danforth, Bentsen, and Chafee for their introduction of these bills and will work actively in support of their passage.

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[15] Sally Reed, "Bringing Technology Into the Classroom." *This World*, April 1983.

American Electronics Association

ATTACHMENT A

JOB GROWTH PROJECTIONS

PROFESSIONAL

UNITED STATES*

	1982	1987	% OF GROWTH***
ELECTRICAL/ELECTRONIC ENGINEER	52,261	32,172	65.5%
SOFTWARE ENGINEER	21,806	23,379	115.0%
MECHANICAL ENGINEER	12,694	6,890	58.8%
COMPUTER ANALYST/ PROGRAMMER	10,567	10,068	102.5%
ELECTRONIC ENGINEERING TECHNOLOGIST	7,607	7,454	107.0%
TOTAL PROFESSIONALS**	167,434	109,449	69.1%

* 815 FACILITIES REPORTING

** INCLUDES CATEGORIES NOT LISTED ABOVE

*** CALCULATIONS BASED ON RESPONDENTS WHO PROJECTED FOR ALL 5 YEARS

American Electronics Association

ATTACHMENT B

JOB GROWTH PROJECTIONS

PARAPROFESSIONAL

UNITED STATES*

	1982	1987	% OF GROWTH***
ELECTRONIC TECH	44,368	25,981	63.1%
ASSEMBLY	110,892	65,242	63.7%
DRAFTING	8,950	5,975	73.3%
TOTAL PARAPROFESSIONALS**	203,447	115,154	60.1%

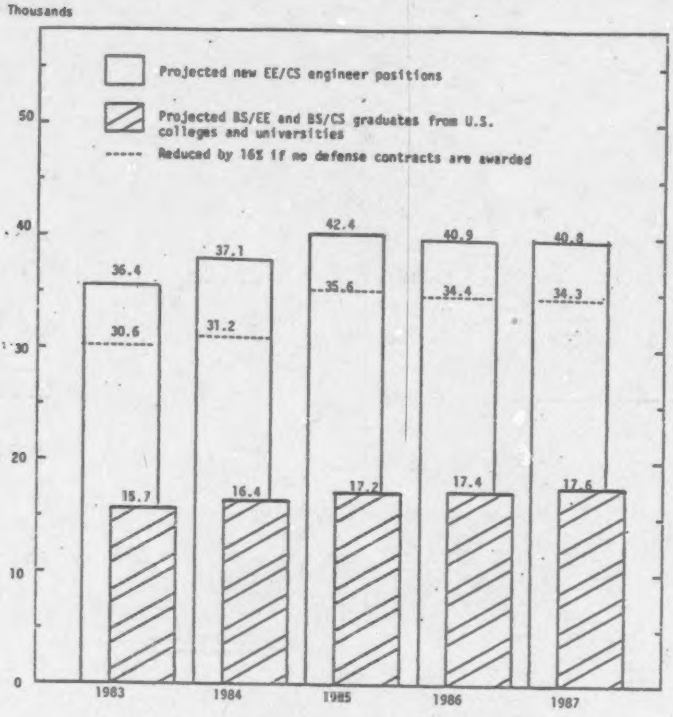
* 815 FACILITIES REPORTING

** INCLUDES CATEGORIES NOT LISTED ABOVE

*** CALCULATIONS BASED ON RESPONDENTS WHO PROJECTED FOR ALL 5 YEARS

AMERICAN ELECTRONICS ASSOCIATION **Attachment C**

EE/CS Engineer Supply and Demand



1983-87

PROJECTED NEED FOR EE/CS ENGINEERS	197,662
PROJECTED NEW EE/CS GRADS	84,256
PROJECTED SHORTFALL	113,406
PROJECTED SHORTFALL(w/o defense)	81,780

METHODOLOGY TO COMPUTE DEMAND

1) EE projections are based on annual growth rate of 10.6% from 1983-87. CS projections are based on 16.5%. Data comes from 815 electronics facilities with combined annual sales of $56B and total employment of 736,000. Based on these sales and employment figures, AEA data reflects about 30% of the entire industry. Projections, therefore, are presented for the entire industry.

2) 16% of the industry projections are based on successful awarding of defense contracts. Therefore demand projections have also been reduced by 16% based on a conservative scenario that no anticipated defense contracts will be awarded.

METHODOLOGY TO COMPUTE SUPPLY

1) Projections of BS/EE degrees are based on National Center for Education Statistics, which reports 2.4% annual growth through 1985, and 2.5% decrease annually from 1985-90.

2) Projections of BS/CS degrees are based on annual growth of 15.8% (average annual increase of degrees awarded from 1977-82). Degree projections assume, therefore, that U.S. colleges will continue to increase the number of BS/CS degrees awarded at the same rate as the past 5 years.

3) Projections reflect 80.2% of entire BS/EE and BS/CS grads, since NSF estimates that 80.2% of all engineers in the U.S. are employed in industry.

ATTACHMENT D

UNEMPLOYMENT RATES OF THE SCIENCE AND ENGINEERING LABOR FORCE: 1972—1981

	1972	1973	1974	1976	1978	1980	1981
TOTAL ALL FIELDS	1.9	0.9	1.7	3.0	1.4	1.1	1.1
ENGINEERS	2.2	0.9	1.3	2.1	1.3	1.0	1.0
ASTRO/AERO	▨	▨	▨	▨	0.6	1.1	1.0
CHEMICAL	▨	▨	▨	▨	1.1	1.1	1.1
CIVIL	▨	▨	▨	▨	3.2	1.2	1.0
ELECTRICAL/ELECTRO	▨	▨	▨	▨	0.5	1.0	1.0
MECHANICAL	▨	▨	▨	▨	0.6	1.0	1.0
OTHER	▨	▨	▨	▨	1.3	1.0	1.0
PHYSICAL SCIENTISTS	1.8	0.7	2.5	4.2	2.0	1.7	1.6
COMPUTER/SPECIALISTS	1.4	0.5	1.0	0.6	0.3	1.0	1.0

SOURCE: NATIONAL SCIENCE FOUNDATION AND
BUREAU OF LABOR STATISTICS.

SRS 82-1660
7-28-82

STATEMENT OF GARY P. ARNOLD, VICE PRESIDENT, NATIONAL SEMICONDUCTOR CORP. ON BEHALF OF SEMICONDUCTOR INDUSTRY ASSOCIATION

Mr. ARNOLD. Mr. Chairman, my name is Gary Arnold. I am vice president and chief financial officer of National Semiconductor Corp. I am here today representing the Semiconductor Industry Association, which is comprised of 55 member companies. We want to express our very strong support for the legislation which is the focus of this meeting, S. 738, which would make that credit permanent. Although it is not the thrust of my comments today, we would like to express our support for S. 1194 and S. 1195.

The U.S. Semiconductor Industry has been a world leader in semiconductor products both in terms of technology and market share. However, competition in both the United States and the world markets among semiconductor manufacturers is intense and is focused primarily between U.S. companies and their foreign competitors. In order for us to meet this competitive challenge and maintain our position in the world semiconductor and and high technology markets, we feel that the preservation of this credit, making the R&D tax credit a permanent fixture, is imperative.

A House committee report at the time the research and development credit was put in place recognized that there had been a deterioration in the level of expenditures for research and development in U.S. industry. They felt very strongly at that time that this credit would in fact stimulate further expenditures in research and development areas. It is our position that it has been a significant contributing factor to the increased levels of research and development expenditures in the high technology and, more specifically, in the semiconductor industry.

I know at National Semiconductor we have increased our research and development expenditures consistently over the last 8 years, going from a level of about $24 million, in 1976, to an approximate spending level in our fiscal year ending next week of $112 million. We have increased our expenditures on research and development in spite of having experienced the two worst profit years in our history, and we will continue to do so. I would not lead you to believe that the research and development credit is the single most important item in stimulating those expenditures, but, however, it is a very critical, very helpful element in our decision process.

As I mentioned before, our primary competitive threat, and I think we are all aware of how formidable that is, is the Japanese industry, and as my associate here pointed out, we are seeing the competitive threat in other jurisdictions. We recently had a company nationalized in France, and the commitment of the French Government to the development of the semiconductor industry is in the billions of dollars. In order for us to maintain a competitive position in the world marketplace, we need such stimuli as research and development.

I was not aware until last night that the administration was proposing only a 3-year extension. I would suggest that a 3-year extension would fail to recognize the realities of the necessity for our continued dedication to research and development expenditures throughout the rest of this century, and it would result in us being back here in 1985 asking for a further extension of it.

The planning cycles in our industry more typically are 3 to 5 years out, and we need the certainty of the availability of that credit for an extended period of time. Thank you for your attention.

Senator DANFORTH. Thank you, Mr. Arnold.

Mr. Considine?

[The prepared written statement of Mr. Arnold follows:]

TESTIMONY
OF
GARY P. ARNOLD
VICE PRESIDENT
NATIONAL SEMICONDUCTOR CORPORATION

On Behalf of
SEMICONDUCTOR INDUSTRY ASSOCIATION

Before the

Senate Finance Committee
Subcommittee on Taxation and Debt Management

May 27, 1983

SUMMARY OF PRINCIPAL POINTS OF WRITTEN TESTIMONY

The U. S. Semiconductor Industry

The U. S. semiconductor industry has been the world leader in semiconductor products both in terms of technology and market share. However, competition in both U. S. and world markets among semiconductor manufacturers is intense and is focused primarily between U. S. companies and their foreign competitors. In this competition, the development of new products and process technologies is critical to a degree that is perhaps unique when compared to other industries.

The R&D Tax Credit Must Be Made Permanent to Ensure the Technological Competitiveness and Economic Survival of the U. S. Semiconductor Industry

The Semiconductor Industry Association (SIA) very strongly supports S.738, which would make the R&D tax credit permanent and indeed making the R&D credit permanent is the number one tax legislative priority of SIA members in this Congress.

The reasons behind the original enactment of the R&D credit -- promoting economic growth, productivity gains and U. S. competitiveness in world markets -- continue to exist today and will grow in importance throughout the balance of this century. In the high technology industries, the need for massive investments of capital resources in R&D activities never has been more evident. We face a formidable competitive threat from the Japanese and European high technology industry which has access to massive government subsidies.

The R&D tax credit has been effective as a stimulus to increase R&D activities. For our fiscal year ending May 31, 1983, we will have expended approximately $112 million on R&D activities in the face of the worst profit performance we have realized over the past 16 years. The availability of the R&D tax credit certainly was an element in our consideration of these expenditures and will continue to influence our planning of future R&D expenditures.

My name is Gary P. Arnold. I am Vice President of National Semiconductor Corporation, headquartered in Santa Clara, California. National is an independent semiconductor manufacturing company with annual sales currently of well over $1 billion per year. I appear before you today representing the 55 companies of the Semiconductor Industry Association (SIA).

Our purpose today is to voice our very strong support for S.738 which would make the R&D credit permanent. Making the R&D tax credit permanent is our number one tax legislative priority in this Congress. In addition, we also support the concepts of the tax incentives embodied in S.1194 and S.1195 to encourage private support of scientific education and university basic research. But first, I would like to take a moment to describe for you the current state of the semiconductor industry.

The U.S. Semiconductor Industry

The U.S. semiconductor industry has been the world leader in semiconductor products both in terms of technology and market share. However, the recent recession in the United States has seriously eroded the sales and, in particular, the profitability of these U.S. companies. We now are at a time when the position of the U.S. industry is already under a severe challenge from Japan and to a lesser extent from the Western European nations.

Despite the current recession in the United States and elsewhere, the worldwide semiconductor industry is expected to undergo explosive growth during the 1980's not only in sheer volume but also in the diversity of market applications. In 1980, world consumption of semiconductors reached $16.1 billion including both unrelated and related party uses. The world semiconductor industry supports approximately a $200 billion electronics equipment market. Industry analysts predict that the world semiconductor volume will reach or surpass $50 billion before the end of this decade and will support a world equipment market of over $500 billion.*/

The U.S. semiconductor industry in 1980 accounted for 63 percent of world consumption, compared to 22 percent for the Japanese industry, and 12 percent for the European industry. By 1983, however, international competition has become much more evenly matched than 1980 overall market share data would indicate. The Japanese, who only began to export integrated circuits to the United States in volume in the mid-1970's, have achieved significant market shares in the United States for a whole array of advanced large scale integrated circuits (LSI) products. Currently Japanese industry holds more than 42 percent of the 16K dynamic RAM (random access memory) market and over 70 percent of the 64K dynamic RAM market. Furthermore, at a 1982 technical conference in San Francisco, all five technical papers on the 256K RAM, which will probably be the workhorse memory circuit of the late 1980's were Japanese. These large memory circuits are the "flagships" of semiconductor technology. Moreover, because they are growing at over three times the rate of all semiconductors, sustained leadership in these commodity products will mean long-term market leadership.

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*/ The semiconductor industry with advancing technology will account for a continued increase in percentage of equipment value from 8 percent in 1980 to 10 percent by the late-1980's.

In 1980, virtually 50 percent of the worldwide semiconductor volume was consumed outside the United States. In the quarter-century history of the industry, the U.S. merchant industry has fiercely competed in all markets worldwide and currently sells 35 percent of its production outside the United States; if historical trends were to continue, there is reason to believe that within 10 to 15 years, 45 percent to 50 percent of U.S. company sales would be in international markets.

Success in worldwide competition is determined by a company's innovation rate and the advancement of technological complexity. As recently as 1970, the semiconductor indutry was producing memory circuits containing 1,000 elements of memory. At present, the industry is commencing production of a dynamic RAM with 64,000 elements on a chip, and by 1989, industry sources speculate that the most advanced chips will contain over 1,000,000 elements.

These high levels of growth and increasing complexity cause dramatic increases in the requirements of U.S. semiconductor companies for new capital. The U.S. semiconductor industry's investment in short-lived process equipment and in R&D is now 28 percent of sales, compared to the U.S. industry average of 7 percent of sales. To finance this investment the industry must constantly generate fresh capital. Indeed, the industry's principal challenge is the availability and cost of its capital.

This is not a problem shared equally by the major foreign producers of semiconductors. American companies have a significantly higher cost of capital than the Japanese semiconductor manufacturers, and potentially the Europeans as well, with whom they must compete. A 1980 study prepared by

Chase Financial Policy, a Chase Manhattan Bank subsidiary, revealed that the cost of capital for the typical American semiconductor company averages 17.5 percent, compared to only 9.3 percent for the Japanese competition. The study also revealed that, although American firms are compelled to earn a rate of return approximately equal to the cost of capital, currently 16.3 percent on operating capital, the Japanese companies fall short of covering capital costs with a return of only 7.5 percent.

In the long term, this structural advantage -- lower cost of capital and current profit indifference -- will work to the distinct disadvantage of American firms, jeopardizing their ability to earn sufficient return to cover capital cost and therefore their ability to compete.

Yet, the support of Japan and other countries for their semiconductor and computer industries goes beyond the relative cost of capital. It includes direct subsidies, research tax incentives and cartels, a sheltered domestic market, accelerated depreciation, soft loans and high leverage. This type of Government supports amounts to a tacit guarantee to investors and results in virtual indifference by shareholders and creditors to low short-term profitability.

The ability of U.S. semiconductor companies to compete internationally has been significantly set back by the recession. For 1981, revenues from most semiconductor products increased by very small amounts compared to historic trends, if they increased at all, and profits were down dramatically. The picture for 1982 is slightly better. However, the U.S. industry is continuing to invest in R&D and in new equipment at a record pace. The industry does not want to be caught without the technology or the manufacturing capacity to deliver the volume of products which will be demanded once the economies of the world begin their recovery.

The R&D Tax Credit Must Be Made Permanent To Maintain U.S. Technological Competitiveness

Accordingly, Mr. Chairman, I am here today to discuss the continuing problems of funding research and development efforts in the semiconductor industry. Specifically, I want to discuss the need for the extension of the R&D tax credit provisions of the Economic Recovery Tax Act of 1981 ("ERTA") Sections 221-223 (Section 44F(a) of the I.R.C. of 1954) which will expire on January 1, 1986. Generally, Section 44F of the I.R.C. of 1954 provides for a nonrefundable income tax credit for qualifying R&D expenses to the extent they exceed a base period amount which generally is the preceding three year's qualifying R&D expenses. The ratio of said credit is 25 percent of the amount so qualified. The R&D tax credit was specifically enacted to address the problem of a declining rate of investment by U.S. industry in research and development activities which threatens our competitivness in world markets.

House Report No. 97-201, 97th Cong., 1st Sess. (1981) ("House Report") states (at p.111) that "(i)n recent years, spending for [R&D] has not been adequate . . ." and that the "Committee believes that the decline in this country's research and development activities has adversely effected economic growth, productivity gains, and our competitiveness in world markets." It further states that the Committee "believes that a substantial tax credit for incremental research and experimental expenditures will overcome the resistance of many businesses to bear significant costs of . . . research programs. . . ."

I believe the reasons which existed for the enactment of the R&D tax credit legislation were accurate at the time of enactment and I believe that they exist today and will continue to exist throughout the balance of this century. In fact, the importance of a national dedication to research and development activities, particularly in the area of high technology, is imperative if we are to maintain our competitive position in the world economy.

In the high technology industries, the need for massive investments of capital resources in research and development activities has never been more evident. We, in the high technology industries, face a formidable competitive threat from the Japanese high technology industry. Our Japanese competitors have access to a large amount of no-interest loans funded by MITI and other Japanese government agencies. The December 14, 1981 issue of Business Week magazine stated that "MITI will lend private industry nearly 500 million U.S. dollars in 1981 in no-interest loans through the Agency of Industrial Science and Technology." A large portion of those funds are directed toward research and development activities in the high technology industries. The 1981 funding by MITI was not a one (1) year phenomenom. It is merely representative of a continuing commitment of the Japanese high technology industry, with the support and assistance of Japanese government to dominate this industry. The Japanese efforts in this area have been and continue to be very successful. However, the

Japanese commitment to developing a strong high technology is but one example, as numerous European countries are taking a similar approach to developing their high technology industries. The R&D tax credit represents a reasonable approach to stimulating research and development activities in U.S. industry. Allowing this credit to expire January 1, 1986 would definitely have an adverse effect on the competitive position of U.S. industry in the world economy.

Speaking with regard to the high technology industry and specifically of the semiconductor industry, the R&D tax credit has been effective as a stimulus to increase R&D activities, i.e., expenditures. Investments by semiconductor manufacturers in R&D activities have continued to expand since the enactment of the R&D tax credit. At National Semiconductor Corporation, we have continued to increase our spending for R&D activities in each of the last eight (8) fiscal years (Exhibit I attached hereto). Even though economic conditions during the period since enactment of the R&D tax credit have been extremely poor, as we are all aware, we at National have increased our spending on research and development activities. For our fiscal year ending May 31, 1983, we will have expended approximately $112 million on R&D activities in the face of the worst profit performance we have realized over the past sixteen (16) years. The availability of the R&D tax credit was certainly an element in our consideration of these expenditures and will continue to influence our planning of future R&D expenditures.

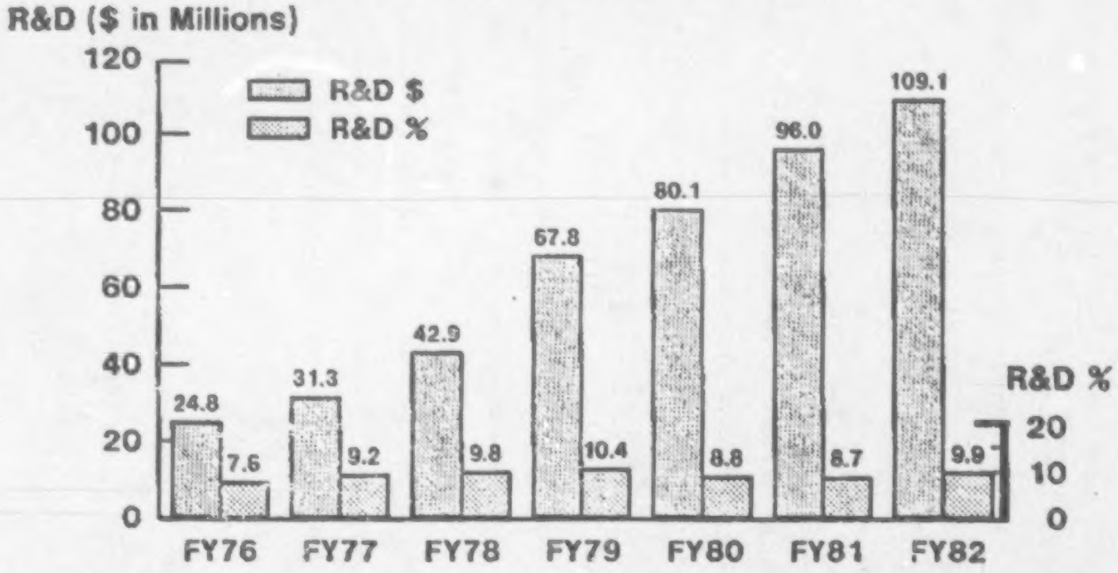
We see an ever increasing need to commit even larger amounts of our resources to research and development activities. Without innovative approaches to the research and development demands of our industry, such as the cooperative research and development activities of the recently formed Semiconductor Research Corporation and the MCC (Microelectronics and Computer Technology Corporation) coupled with the benefits of R&D tax credits, we as an industry will not be able to maintain our competitive edge in the world high technology market place.

In summary, the high technology industry and more specifically, the semiconductor industry, support the extension of the R&D tax credit provision of Section 44F(a) of the I.R.C. of 1954. In fact, we would like to see the termination provisions of this legislation amended to provide for the indefinite extension of these tax credit provisions.

EXHIBIT I

RESEARCH AND DEVELOPMENT

Percent of Sales



Note: FY77-FY81 Data Restated

National Semiconductor

STATEMENT OF KEVIN T. CONSIDINE, DIRECTOR OF THE APPLIED RESEARCH GROUP, TEKTRONIX, INC., BEAVERTON, OREG., ON BEHALF OF COMPUTER AND BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION, WASHINGTON, D.C.

Mr. CONSIDINE. Good morning, Mr. Chairman. My name is Kevin Considine, and I am the director of the Applied Research Group of Tektronix, in Beaverton, Oreg. I am appearing today on behalf of the Computer and Business Equipment Manufacturers Association, CBEME, an association composed of 42 manufacturers of computer systems, sophisticated business equipment and other high technology electronics products. I welcome this opportunity to appear before this subcommittee. I, too, might mention that I am on my maiden voyage.

Let me summarize CBEMA's positions on the various tax bills which are before this subcommittee. First, we support very strongly S. 738, which would make the R&D tax credit permanent. We support S. 654, which provides that deductions for U.S. R&D expenses will be allocated to U.S. source income and deducted from such income in determining U.S. source of taxable income. We would especially like to compliment Senator Bob Packwood, the chairman of this subcommittee, for his leadership in supporting this bill. And third, we support tax incentives that encourage private support of scientific education and university basic research, and believe that S. 1194 and S. 1195 offer constructive proposals to encourage corporations to take a leading role in providing such support.

Because of time constraints, I will address only the most important of these measures, the R&D credit. The fundamental characteristic of U.S. high technology electronic companies, which distinguishes this industry from other U.S. industries, is the overriding need to continually invest in major research endeavors to develop and apply new technologies and products in order to survive. A very significant portion of the sales of many CBEMA members, as well as many other companies in this industry, lies in products that were not even in existence just a few years ago. In this highly competitive environment, an electronics company which fails to continuously advance technologically will find that its products have been rendered obsolete by foreign competitors, and that its markets have disappeared.

SBEMA members and other high technology companies may invest as much as 8 to 10 percent of their revenues annually in R&D, over three to four times the percentage invested by U.S. industry in general. Tektronix, in fiscal year 1982, invested almost $110 million in R&D out of sales totaling $1.2 billion. That represented an $18 million increase in R&D investments over the previous year. For these reasons, we support very strongly S. 738, which makes the R&D tax credit permanent. Indeed it is the paramount tax legislation priorities for CBEMA members for this Congress.

Having enacted the R&D credit and thereby encourage companies to incur R&D risks which they otherwise might have been unwilling to bear, Congress should not reverse this R&D tax incentive by allowing the credit to lapse. The permanence of the tax credit would tip the scales in favor of going ahead sometimes on sizable projects, and thereby seizing opportunities that otherwise would be foregone.

When a company such as my own is determining where to invest its resources, there always arise the question of balancing the short term and the long term. The short term always seems to have a greater sense of urgency associated with it, and therefore is the bias toward cutting into the long-term programs.

The R&D tax incentive addresses this issue directly. It can and does encourage investment in long-term areas of an R&D strategy. For example, at Tektronix we have developed the leadership position in gallium arsenide technology, a technology that enables us to manufacture very high performance semiconductor chips. The position we currently enjoy in this technology is a direct result of Tektronix investing heavily over the last few years in what initially was a very speculative program.

In a similar example, we recently announced a completely new way of making high-resolution color displays, an area where the United States has had strong foreign competition. Once again, this advance comes at the end of a number of years of heavy investment. It is still too early to judge the full effectiveness of the R&D credit, but R&D spending has remained strong, faring relatively well when compared with the budgets of most other corporate departments, despite the high degree of economic uncertainty, high interest rates and lower profit levels.

The R&D tax credit was of immense value in maintaining and increasing R&D investments during this economic downturn. Thank you.

Senator DANFORTH. Thank you, sir.

[The prepared written statement of Mr. Considine follows:]

STATEMENT OF KEVIN T. CONSIDINE

DIRECTOR OF APPLIED RESEARCH GROUP
TEKTRONIX, INC.

ON BEHALF OF
THE COMPUTER AND BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION
(CBEMA)

Before the
Subcommittee on Taxation and Debt Management
of the Senate Finance Committee

May 27, 1983

My name is Kevin T. Considine. I am Director of the Applied Research Group of Tektronix, Inc., located in Beaverton, Oregon. I am appearing today on behalf of the Computer and Business Equipment Manufacturers Association (CBEMA), an association composed of 42 manufacturers of computer systems, sophisticated business equipment, and other high technology electronics products. I welcome this opportunity to appear before this subcommittee on behalf of CBEMA and its members and to offer our views on the tax bills you are considering.

Research and development (R&D) is a fundamental tool toward the dual goals of preserving U.S. high technology leadership and maintaining U.S. economic well-being. To encourage R&D activities among U.S. companies, CBEMA recommends these actions:

First, and of utmost importance, we support very strongly making permanent the R&D tax credit. It is a major tool through which the U.S. government can encourage productivity gains and maintain U.S. technological competitiveness.

Second, we support the treatment of deductions for R&D expenses attributable to U.S. activities as allocatable to U.S.-source income.

Third, we support tax incentives that encourage private support of scientific education and university research.

To understand why these three measures -- and especially a permanent tax credit -- are so important, let me give you some background on the role of R&D in today's high technology companies.

I. BACKGROUND RESEARCH AND DEVELOPMENT IN THE U.S. HIGH TECHNOLOGY ELECTRONICS INDUSTRY

The fundamental characteristic of U.S. high technology electronics companies, which distinguishes this industry from other U.S. industries, is that these electronics companies must continually invest in major research endeavors to develop and apply new technologies and products in order to survive. Competition in both U.S. and world markets among high technology electronics manufacturers is intense and is focused, to a great degree, between U.S. companies and foreign competitors. In this highly competitive environment, an electronics company which fails to continuously advance technologically will find that its products have been rendered obsolete by foreign competitors. Its markets will disappear. A very significant portion of the sales of many CBEMA members, as well as many other companies in the high technology electronics industry, lies in products that were not even in existence just a few years ago.

A firm's ability to develop and apply "breakthrough" products and technologies is critical to obtaining a competitive advantage. For example, a year's advantage in introducing a new product often can provide the company with as much as a 20-25 percent cost advantage over competing companies. Conversely, a year's lag in introducing a product places a company at a significant disadvantage vis-a-vis its competitors. Accordingly, U.S. high technology electronics companies are locked in a continuous, intensive race with foreign competitors -- most of which are highly subsidized by their governments -- to bring new or improved products and manufacturing processes to the marketplace as soon as possible.

Given this fast pace at which the high technology electronics industry is evolving, each company must devote very substantial efforts to R&D. CBEMA members and other high technology companies may, on the average, invest as much as 8 to 10 percent of their revenues annually in R&D -- over 3 to 4 times the percentage invested by U.S. industry in general. For example, Tektronix in fiscal year 1982 invested almost $110 million in R&D activities out of sales totaling $1.2 billion. This R&D spending represented an $18 million increase in R&D investments over fiscal 1981, in which year Tektronix invested more than $91 million on a base of sales of approximately $1 billion. These 1981 R&D expenditures in turn were almost $14 million more than we spent on R&D in fiscal 1980.

II. PERMANENT TAX CREDIT

CBEMA supports S.738 in that it makes permanent the incremental tax credit enacted by the Economic Recovery Tax Act (ERTA) of 1981. By encouraging increased R&D, the bill helps strengthen U.S. competitiveness and economic leadership.

Under current law, the R&D tax credit is due to expire at the end of December 1985. Eliminating this 1985 "sunset" of the R&D credit is the paramount tax legislative priority of CBEMA members for this Congress.

The R&D tax credit was adopted by Congress in 1981 primarily for two reasons. First, the credit was intended to serve as an incentive for increases in R&D spending, thereby functioning as an incentive complementary to that embodied in ACRS, which was intended to increase investment in plant and equipment. Second, the R&D credit was deemed to be a relatively efficient way of providing some tax cut in ERTA for high technology companies, who pay relatively high effective tax rates and receive little if any benefit from ACRS.

In enacting the R&D credit, Congress pointed to the close and basic relationship between this country's R&D activities and U.S. "economic growth, productivity gains, and our competitiveness in world markets" and the consequent need to promote continuous growth in R&D expenditures. (House Rept. No. 97-201, 97th Cong., 1st Sess. (1981) 111; Sen. Rept. No. 97-144, 97th Cong., 1st Sess. (1981) 77). By comparison, for example, our foreign competitors, led by Japan and West Germany, have devoted more resources, as a percentage of gross national product (GNP), to R&D over the past 20 years than has the United States, with West Germany now spending 2.15 percent of its GNP on civilian R&D in 1980, and Japan spending nearly 2 percent of GNP, as compared with only 1.66 percent of GNP spent by the United States on R&D activities. Japan and West Germany correspondingly have experienced much higher rates of growth in productivity -- 466 percent by Japan, for example, as compared with 69 percent by the United States. As to the United States, it is well established that, prior to the enactment of the R&D credit, the decline in U.S. productivity growth over the last decade paralleled the declining pattern of U.S. R&D spending.

These considerations which led Congress to enact the R&D credit in 1981 continue to exist today. Indeed, with the rising cost of ever-more sophisticated high technology R&D projects and the intensified competition from foreign manufacturers, these considerations are of even greater importance in 1983 and will continue to grow in importance over the decade ahead. The process of R&D is fraught with risk and necessarily has a long-range focus. As both the Senate Finance Committee and House Ways and Means Committee noted during adoption of the R&D credit, "the relationships between the investment in research and the subsequent earnings often are less directly identifiable and many businessmen are reluctant to allocate scarce investment funds for uncertain rewards." (House Rept. No. 97-201, at 111; Sen. Rept. 97-144, supra, at 77). Having enacted the R&D credit and thereby encouraged companies to incur R&D risks which they might otherwise have been unwilling to incur, Congress should not reverse this R&D incentive by allowing the credit to lapse.

Moreover, many major R&D projects have a cycle of 5 years or more with the greatest dollar amounts of cost coming toward the end of the cycle. Thus, for those R&D projects which would be undertaken now in response to the R&D credit, a substantial portion of the R&D costs will be incurred in years after 1985, the point at which the R&D credit currently is scheduled to lapse. Before undertaking a project and at each of the numerous "checkpoints" in the cycle of a project, a determination will be made whether to undertake or continue the research effort. If the tax incentive embodied in the R&D credit disappears, the company's assessment of the financial risk of undertaking or continuing the research project likely will become more adverse and might well lead to termination of the project.

I predict that if the R&D tax credit is made permanent, strategic planners in corporations, who are required to look into the future, will take a harder look at speculative R&D work. The permanence of the tax credit will tip the scales in favor of going ahead, sometimes on sizable projects, and thereby seizing opportunities that otherwise would be foregone. When a company such as my own is determining where to invest its resources, there always arises the question of balancing the short-term and the long-term. The short-term always seems to have a greater sense of urgency associated with it and therefore, there is a bias towards cutting into the long-term programs in favor of the short-term programs. The R&D tax incentive addresses this issue directly. It can, and does, encourage investment in the longer-term areas of a R&D strategy.

For example, at Tektronix, we have developed a leadership position in gallium arsenide technology, a technology that enables us to make very high-performance semiconductor chips. The position we currently enjoy in this technology is a direct result of Tektronix investing significant resources over the last few years in what was initially a very speculative program. Research and development tax incentives go a long way towards encouraging such activities.

In a similar example, Tektronix has recently announced a completely new way of making high-resolution color displays for such things as computer terminals and high-definition television. This is an area where the U.S. has had strong foreign competition. With this new technology, we expect to generate significant markets and job opportunities. Once again, this technology announcement comes at the end of a number of years of heavy R&D investment.

At this juncture, insufficient experience exists upon which to judge the full effectiveness of the R&D credit. The credit will only be fully phased in this year, 1983. However, certain general trends do exist which support the incentive effect of the credit. First, R&D spending remained strong during the most severe economic recession since World War II. In fact, company-sponsored R&D increased from $30.5 billion in 1980 to $35.4 billion in 1981. Though the 1982 figures are not yet available, experts estimate that R&D spending in 1982 will reflect an increase of 10 percent over 1981.

According to a National Science Foundation (NSF) survey, R&D expenditures in the machinery industry (which includes companies producing office, computing, and accounting machines) should rise more than 8 percent to $6.9 billion in 1983. (See National Science Foundation, "Science Resources Studies: Highlights," September 9, 1982, NSF 82-324.) NSF estimates that R&D spending in the electrical and communications industry, which increased 12 percent in 1982, should rise at least another 9 percent to $7.7 billion in 1983 despite the current economic uncertainties facing the industry as a whole. Finally, NSF projects that the professional and scientific instruments industry, in which R&D expenditures grew by 15 percent in 1982, will maintain a high rate of growth in R&D expenditures, rising an estimated 14 percent in 1983 to $3.3 billion.

By contrast, expenditures for non-residential investment increased only slightly between 1981 and 1982, and expenditures for machinery and equipment fell from $216 billion in 1981 to $207 billion in 1982. Thus, according to the NSF survey results, R&D budgets are faring relatively well when compared with the budgets of most other corporate departments during the tight financial squeeze brought about by the recession. An important reason for the continued strength in R&D spending, according to the NSF survey, is that, despite the high degree of economic uncertainty, lower profit levels, and higher interest rates, corporate R&D departments have been persuasively arguing with management for protection of R&D activities from internal corporate budget cuts because of the more favorable tax treatment such R&D projects currently receive, as compared with other discretionary company expenditures such as marketing outlays.

For my own company I can say that the R&D tax credit was of immense value in helping us maintain and increase our research and development investments despite the economic downturn in the country and in our bottom line. The result will be a better foundation for Tektronix to emerge from this recession with new products that will fuel a new round of growth -- and, just as important, a new round of job-creation. Thus, it seems clear that the R&D credit has had some beneficial effect on R&D spending, thereby vindicating its policy rationale of encouraging such spending.

Failure to extend the R&D credit will not only eliminate a valuable incentive, it will mean that high technology companies -- which already have among the highest effective tax rates in U.S. industry -- will have suffered, on net, a substantial tax increase as the result of the combined effect of the 1981 (Economic Recovery today Tax Act) and the 1982 (Tax Equity and Fiscal Responsibility Act) tax bills. As noted above, one of the primary reasons for enactment of the R&D credit was the congressionally-perceived need to provide at least some tax reduction to high technology companies, thereby overcoming a major deficiency of ACRS, which provided very little tax benefit to such companies, as enacted in 1981, and which is detrimental to most such companies as modified in 1982. Allowing the credit to lapse would thus increase the tax disparity between high technology companies and capital intensive industries which benefited greatly from ACRS.

In sum, it has become increasingly clear that the economic progress of the United States over this and the coming decades depends in large part upon the prosperity and growth of its high technology industries. Such prosperity and growth, in turn, are dependent upon the continuing vigor of the R&D activities of these high technology industries -- activities which are the lifeblood of these industries and the source of their technological and economic survival in the intensely competitive world markets. If Congress and this Administration are truly serious about fostering an environment in which the high technology industries can flourish, the R&D credit should be made permanent through the prompt enactment of S.738.

III. ALLOCATION OF DEDUCTIONS FOR R&D EXPENSE

A second issue that affects R&D is the allocation of deductions for R&D expenses. CBEMA supports S.654, which amends I.R.C. Section 861 so that deductions for R&D expenses, which are attributable to activities conducted in the United States, will be allocated to income from sources within the United States and deducted from such income in determining U.S.-source taxable income. Under the rules governing the allocation of R&D expenses to foreign operations prior to the Economic Recovery Tax Act of 1981 (ERTA), when a taxpayer performed R&D in the United States, some of the tax deduction for such expenditure was allocated to the taxpayer's foreign income, thereby denying the taxpayer a foreign tax credit on that income and effectively depriving the taxpayer of the benefit of that portion of the deduction in the United States. Congress suspended these regulations in ERTA as part of the legislative effort to encourage R&D activity. However, this suspension was only for a two-year period, and for taxable years either beginning in 1984 for a calendar year taxpayer or, in the case of fiscal year taxpayers a 1984 taxable year beginning in 1983, the old pre-ERTA regulations are again applicable.

For some members of CBEMA, the issue of appropriate allocation rules under Section 861 is important because they are losing important tax benefits. For most other CBEMA members, the pre-ERTA allocation rules present significant difficulties and result in significant distortion of business judgments in the management of foreign operations and the conduct of R&D activities. For these reasons, CBEMA urges the enactment of S.654 as a legislative solution to the issue of allocation of R&D expenses as between foreign-source and U.S.-source income.

IV. TAX INCENTIVES FOR PRIVATE SUPPORT OF SCIENTIFIC EDUCATION AND UNIVERSITY RESEARCH

The two issues I have discussed so far -- the most important, a permanent R&D tax credit and a secondary issue, allocations of deductions for R&D expenses -- are two ways Congress can support the R&D effort in the U.S. In addition, there is a third way: encouraging private support for scientific education and university research. Both S.1194 and S.1195 address the need to improve our technical education base and the need to encourage greater basic research.

At the university level, education in mathematics, engineering, and the physical, biological, and computer sciences has suffered from a chronic shortage of faculty and a severe lack of up-to-date scientific equipment upon which to learn and perform research. For example, there now exist approximately 2,000 vacancies in university engineering faculties, and similar shortages exist in mathematics and other scientific disciplines. Universities face great difficulty in stretching tight budgets to compete with private firms for graduate-level engineers. Merely to replace outdated scientific equipment, universities would have to invest hundreds of millions of dollars. The result of these deficiencies has been a severe shortage of trained mathematicians, scientists, and engineers. S.1194 and S.1195 offer constructive proposals by using the tax system to encourage corporations to take a leading role in combating these problems.

The high technology electronics industry recently has experienced tremendous and rapid growth in product innovation -- growth which approaches the limits of existing scientific knowledge. To permit future growth in this high technology, corresponding advances must be made in the foundations of knowledge in the field of mathematics, engineering, and physical science which underlie such technology. Accordingly, CBEMA welcomes the efforts in these bills to encourage spending by private firms for basic research projects conducted by universities.

I appreciate the opportunity to address you on CBEMA's support for permanent R&D tax credits, allocation of R&D expenses and tax incentives to support education. Your support for these measures will help strengthen the U.S. high technology in the decades to come. Thank you.

Senator DANFORTH. It is my understanding that Dr. McCrea's plane has been delayed, and I don't know if he is still going to appear sometime later in the morning. But if he does, of course, we will hear from him then.

Gentlemen, let me ask you this. It is your view, as I understand it, that the R&D tax credit is working, that is, that it has been some incentive or encouragement to businesses to invest more than they would otherwise invest in research and development. Is that correct?

Mr. CONSIDINE. It is very much in the case of Tektronix. Last year we spent $110 million on our engineering budget, and we claimed a credit of approximately $5 million. And the effect actually is greater than that, of course, since it is a credit on the bottom line.

Senator DANFORTH. The credit was an encouragement to spend more on research and development?

Mr. CONSIDINE. Without question. We are convinced at Tektronix of the need to increase even more than we have now our spending in this area. And we are looking for every way we can to increase that.

Senator DANFORTH. Do you agree with that, Mr. Moore?

Mr. MOORE. Yes, Senator. The one thing that I would like to call to your attention is that the smaller companies, if you take the AEA, of the 2,000-plus member companies, more than 75 percent have under 250 employees, they typically have yet to really appreciate the value of the R&D tax credit. And, in fact, many of those companies still are not aware of its existence or its provisions.

Senator **Danforth**. Mr. Arnold?

Mr. **Arnold**. I believe the credit has been influential during these last 2 years when we have all had some rather difficult times. There has been a tendency to cut most areas through the budgetary control process. However, we did not cut in the research and development area, and I would suggest that such a result was influenced by the credit's availability.

Senator **Danforth**. And it is the view of each of you that when businesses make decisions as to what their strategy is going to be for the future in research and development that they make their plans on a multiyear basis. And I suppose that the kind of buildings they are willing to put up, the kinds of equipment that they are willing to buy, the kinds of personnel that they are willing to hire all depend on a multiyear strategy. And for that reason it would be to your advantage to make the research and development credit permanent rather than to extend it for an additional 3 years.

Mr. **Arnold**. Mr. Chairman, we agree with that position.

Mr. **Moore**. Yes.

Mr. **Considine**. This is particularly true since decisions made this year will cost more in later years in any given program, typically.

Senator **Danforth**. Now, the next question I want to put is somewhat related to S. 738, and I think it is more related to S. 1194, and it has to do with the relationship between industry with a scientific orientation, technological orientation, to the university community. I think it was pointed out by Congressman Zschau earlier this morning that there is a strong relationship between the two, that one of the reasons that high technology businesses located in certain parts of the country is that generally there is a university community or a scientific research type university in the area with which there is a close working relationship.

The thrust of this legislation, especially 1194, is to attempt to foster that kind of relationship and interaction between research and technology type businesses, on one hand, and the academic community, on the other hand.

Do you have anything that you could share with the subcommittee with respect to that relationship?

Mr. **Moore**. I would share with you one of the reasons for the explosive growth of technology in Texas. And as you know, Senator, we just were favored with the location of the new consortium, MCC, that will go to Austin. MCC selected Austin over a series of some 50 cities, again, because of the presence of the fine engineering school at the University of Texas and the adjacent engineering capabilities of Texas A&M. In addition to that, the American Electronics Association, as an independent initiative, has begun to work with a number of colleges and universities around the country to upgrade substantially the caliber of their engineering organizations and schools through the independent donation of equipment, not tax favored necessarily, and through helping in terms of cross-teaching in a number of ways of promoting those schools.

So as we watch high tech grow in Texas, clearly the leavening of that growth is the engineering faculties' and school reputations.

Senator **Danforth**. Mr. Arnold?

Mr. **Arnold**. Well, we have continually working relationships with both Stanford and the University of California at Berkeley.

We maintain a very close relationship. Those are critical to our location. I think that perception is very accurate.

As this gentleman just pointed out, the MCC was located in Austin, and one of the primary considerations there, as I was somewhat close to the selection process, was a commitment of the University of Texas and their alumni to expand their engineering school through the addition of several additional chairs in the engineering school. It is absolutely critical to have this university engineering resource close to the electronic facility.

Senator **DANFORTH**. Mr. Considine?

Mr. **CONSIDINE**. My company, Tektronix, is located right up in the northwest corner and away from any of the more established, and shall we say, more famous universities. But we have worked with our local universities very hard over the years because we feel very strongly about this corporation. And, in fact, earlier this year, despite our lower earnings and what have you, we made a very significant grant to the local universities in that area for this very purpose.

Senator **DANFORTH**. Gentlemen, thank you very much.

The next panel on 1194 and 1195, Dr. Olson, Mr. Scheier, Mr. Bottoms and Mr. Thomson. Dr. Olson?

STATEMENT OF DR. JAMES C. OLSON, PRESIDENT, UNIVERSITY OF MISSOURI

Dr. **OLSON**. Senator Danforth, as you indicated, I am James Olson, president of the University of Missouri. I am pleased to present testimony this morning on behalf of the American Council on Education, the Association of American Universities, and the National Association of State Universities and Land-Grant Colleges. In my formal testimony which has been filed with the committee, I urge Congress to pass S. 738, which will eliminate the sunset provision of the incremental R&D tax credit. In that testimony I also comment on equipment donation provisions of S. 1194 and S. 1195. I would like to request that my formal testimony be included in the record so that I may confine my remarks at this time to the nonincremental tax credit for university research that is authorized in both S. 1194 and S. 1195.

[The prepared written statement of Dr. Olson follows:]

American Council on Education
Association of American Universities
National Association of State Universities
and Land-Grant Colleges

One Dupont Circle, N.W.
Washington, D.C. 20036

United States Senate Committee on Finance
Subcommittee on Taxation and Debt Management

S.738 - Research Incentive Continuation Act of 1983
S.1194 - Technology Education Assistance Act
S.1195 - High Technology Educational Development Act of 1983

JAMES C. OLSON, President
University of Missouri

May 27, 1983

SUMMARY

The members of the American Council on Education, the Association of American Universities and the National Association of State Universities and Land-Grant Colleges are pleased to endorse S.738 which makes permanent the incremental tax credit for research and development, and S.1194 and S.1195 which extend provisions of the equipment contributions legislation and the research and development tax credit.

AAU's principal interest in the legislation (in addition to eliminating the sunset of the incremental R&D tax credit) is the authority for companies to exclude expenditures on university basic research from the qualified research expenses in base period. (Commonly referred to as excluding those expenditures from the rolling base, this provision would authorize a non-incremental credit for the support of university research.)

With respect to the equipment contributions legislation, the AAU supports the expanded and revised deduction for contributions of instructional and research equipment and proposes that institutions be authorized to use donated equipment for badly needed language instruction as well as science and engineering. We are pleased that gifts of computer software will qualify, under the proposed legislation, for the new deduction. Finally, if used equipment is to qualify for the expanded deduction, we think the clearinghouse proposed in S.1194 should be authorized.

With respect to AAU's principal interests, a non-incremental tax credit is appropriate for university research because basic research requires long-term, level funding. Furthermore, if it authorizes a non-incremental tax credit, Congress will assure that university basic research becomes a larger part of the total national research effort.

An incentive for the increased support of university basic research serves the national interest because 1) basic research underpins new technologies and industrial innovation, and 2) because cooperative university-industry research encourages technology transfer and enables taxpayers to capitalize on the continuing federal investment in university basic research.

The non-incremental credit is further justified because 1) basic research normally produces findings of little value to commercial firms and, therefore, it is usually paid for by the federal government, and 2) the cost of university research is inflated because of the expense of training graduate assistants... again, a cost frequently assumed by the federal government.

Mr. Chairman, Member of the Committee, I am James C. Olson, President of the University of Missouri. I want to thank you for this opportunity to testify. I am honored this morning to represent my institution, the American Council on Education, the Association of American Universities and the National Association of State Universities and Land-Grant Colleges. AAU members are the principal universities in the United States and Canada.

Let me say at the outset that our Associations endorse enthusiastically the "Technology Education Assistance Act" (S.1194) introduced by Senator Danforth, the "High Technology Educational Development Act of 1983 (S.1195) introduced by Senator Bentsen and S.738 introduced by Senator Danforth.

While we can endorse the various parts of each of these bills, it is our opinion that the authority for companies to exclude expenditures on university basic research from the incremental R&D base will have important benefits for the country and, therefore, it is our principal priority. That authority, if it is legislated, will give companies a non-incremental tax credit for their support of university research.

I will devote most of my remarks to the research tax credit but I would be remiss if I failed to touch first on other parts of the legislation before the Committee.

The Sunset

It should go without saying that S. 738 is critical. It would eliminate the sunset provision of R&D tax credit. As you know the sunset, according to current law is effective on January 1, 1986. On that day, the R&D tax credit expires. In other words, the provision of S.1184 and S.1185 that would expand the R&D tax credit by making support of university research non-incremental will be moot if the basic legislation passes out of existence in two and a half years. We urge the Committee and both Houses of Congress to pass S.738 and to do it soon to remove all doubt about our country's stake in a strong national R&D effort.

Equipment Contributions - Elementary and Secondary Schools

Let me pass over the provision that would encourage the contribution of computation equipment to elementary and secondary schools with the note we can certainly support legislation that will ensure that future college students will be comfortable with all reasonable methods of information processing. This legislation appears to be a step in that direction.

Equipment Contributions - Higher Education

The milestone in equipment contributions was passed with the enactment of ERTA-81. That legislation, as you know, provided for an enhanced charitable deduction for corporate contributions of equipment for research and research training to colleges and universities. We hear that companies are beginning to make important equipment contributions.

In recent months, a major brewer and a large computer corporation have come forward with substantial and important gifts of equipment for research and research training for the University of Missouri. I am convinced that the business and industrial sector would move forward in an expanded role of equipment contributions under the provision of ERTA-81.

For our purposes, the important change proposed by these bills is the use of donated equipment for the direct education of students in science and engineering. As you know, computers are fast taking the place of the yellow pad, the blackboard, the slide rule, the reference section of the library and in some cases even the lab assistant. It is unreasonable to deny our institutions class room use of donated equipment. On that same score, we are pleased to note that contributions of computer software will qualify for the enhanced deduction.

With respect to instructional equipment, we believe that donated equipment should be authorized for use in language laboratories. We in the universities and you in the Congress have been concerned for some years about the literacy of our youth in foreign languages. Not only is one's education deficient if there is no foreign language capacity but our international businesses and certain government agencies require such competence from many employees. Expanded and more flexible language laboratories will enable our institutions to improve their capacity to provide language instruction.

Unfortunately, it appears that the contribution-sale rules, at least with regard to the purchase of scientific equipment, would be eliminated by S.1194 and S.1195. We think that language to reverse this result would be an appropriate and important modification of this legislation. Elimination of these rules seems likely to reduce the ability of universities to obtain expensive, state-of-the-art equipment that otherwise might be unobtainable.*

*Under current law, universities can negotiate with the manufacturers to purchase an item of equipment for an amount less than its fair market value. The excess of the fair market value, after appropriate tax basis allocation, over the sale price is treated for tax purposes as a charitable donation.

Finally, I note that the equipment contributions provision of the legislation authorizes the enhanced deduction for the donation of used equipment. In some of our traditional engineering and science departments, used equipment will indeed be helpful, but by and large researchers who work at the limits of their disciplines will have use only for new, state-of-the-art equipment. On that score, I am intrigued with the clearinghouse proposed in S.1194. We will be more comfortable in checking the Federal Register for exactly what we need than we will be in resisting the entreaties of friendly vendors who wish to dispose of items of marginal utility.

Non-Incremental Tax Credit for University Basic Research

Let me devote the balance of my time to the proposal in both bills that expenditures on university research be eliminated from the rolling base. With that change, the incremental credit for university research in current law will become non-incremental.

The members of the associations I represent believe that passage of this legislation will have fundamental and very positive consequences for research and development in the United States, for industrial competitiveness and innovation and ultimately or the U.S. balance of trade.

First, I want to describe how the non-incremental credit will increase company support for university research. Then, I will touch briefly on the national interest, why such an incentive should be legislated; and finally, I will describe an appropriate federal role in the university-industry relationship.

The question arises, first of all, if an incremental credit is intended to increase industrial expenditures on research and development, what is a non-incremental credit intended to do? Very simply, with or without the incremental credit, a non-incremental tax credit for industrial support of university research is intended to increase the percentage of total U.S. research that is conducted by colleges and universities. The tax code is often used to encourage socially desirable behavior. The energy conservation credit, the charitable deduction, the proposed tuition tax credit are all intended to influence tax payer behavior in a direction deemed by the Congress to be in the national interest. Likewise, a tax credit for support of university basic research will encourage companies to alter their behavior and divert some of their R&D investments to universities.

To amplify, further, let's suppose, for a moment, that this law has been passed and an R&D manager is planning a company's 1984 research program. She has just about committed her budget and is debating between a new university research initiative and short-term product improvement investment. All other things are equal and the manager notes that the university expenditure will not affect the company's rolling base and the product improvement cost will, so she chooses the university proposal. She notes further that the tax credit can be earned with level company support indefinitely (so long as the base expenditures are met each year). It seems logical to assume that the non-incremental credit will shift a small portion of the total research effort from in-house to universities for the conduct of basic research.

Before describing the national interest in this shift to university research, let me add that university research requires long-range and relatively level funding. I can't fathom a one-year basic research contract. Companies cannot expect fruitful results in less than three or maybe even five years. And, of course, it's in the nature of basic research that there may never be fruitful results.

I mention this need for long-term level funding to note for you that the incremental credit is incompatible with basic research. We are not unnecessarily seeking an increasing level of effort, rather a constant flow of support over a relatively long period of time. And, of course, a non-incremental credit proposed by this legislation encourages just that kind of support.

To summarize this part, the purpose of the non-incremental credit is to encourage companies to shift a small portion of their R&D expenditures to universities. It is variously estimated that industry now supports from 3% to 7% of the research conducted by universities. The non-incremental credit should, over time, bring about a significant increase.

The next obvious question is, why? Why should the government forego revenue in order to encourage tax-paying companies to support university research?

First, because it is in the national interest to encourage industrial innovation and competition which should ultimately have a favorable affect on our balance of trade and second, because the national interest is served when the research findings of university scientists are transferred to the market place.

It is unnecessary, I hope for me to belabor the obvious, that basic research undergirds industrial innovation, new technologies and industrial processes that make U.S. companies competitive with their counterparts overseas.

Secondly, increased industrial support of university research will expedite the transfer of basic research findings to industrial laboratories. Technology transfer is the critical link between basic research and the public welfare. The federal government spends roughly $4 billion a year on university basic research. The public does not capitalize on that investment until the results reach either the market place or the doctor's black bag.

Technology transfer is accomplished in a number of ways: first and most importantly through the publication of research results. It comes about also through meetings of scientific societies whose members include both industrial and university researchers. Consulting arrangements between university scientists and companies also brings about important information exchanges. But cooperative research agreements between commercial firms and universities are becoming increasingly important. What better way is there to transfer research information than by encouraging university and industrial scientists to work cooperatively on the same projects? The research tax credit will foster those arrangements.

I believe that industrial innovation and technology transfer amply justify the revenue loss of the non-incremental tax credit but, in concluding this part of my testimony let me add that the tax credit can be further justified if we examine what the revenue loss will support. Here we are talking about an appropriate federal role in university-industry research agreements.

First, revenue foregone by the government will reduce the risk companies take when they invest in basic research. We are not asking for an oil depletion allowance but the analogy of the dry hole is appropriate. When companies pay for applied research, they know what they want and what they can expect to get. When they pay for basic research, they gamble. They have no idea what the outcome will be or if anything practical from a commercial point of view, will be produced.

So the government, with the tax credit, will reduce the investment risk somewhat. But there are two direct benefits for the government; first there is general agreement that supporting basic research is something the government should do. If the government didn't do it, no one would. Inevitably, basic research paid for by industry frequently will produce results of little or no commercial value. This indirect support for basic research costs the government a great deal less than it would if the government had to pay for it directly.

Secondly, it is reasonable to assume that most cooperative research projects will employ graduate research assistants who will contribute to the projects and who will receive educational benefits from them. This educational component is costly. Projects would be less expensive if professional researchers were employed instead of graduate students, but in addition to research our institutions are in the business of education and we cannot sacrifice that component in the interest of cost.

(Let me add parenthetically, that graduate students trained on cooperative projects should be more valuable to their employers because of their work on cooperative projects.)

Support for the training of future scientists is a well accepted federal role. Many hundreds are supported directly each year through NIH grants and others are supported indirectly through the research grants and contracts of other federal agencies.

Let me summarize this part: While the incremental tax credit is designed to increase the total industrial R&D effort, the proposed non-incremental university tax credit will encourage a small shift of research from in-house to the universities.

The revenue loss is a good investment because it will enhance industrial innovation and competitiveness and it will enable the country to capitalize on its historic investment in basic research.

Finally, the revenue loss will defray part of the risk that companies face when they support industrial research; and with the tax credit the government will continue its traditional support of non-commercial basic research and research training for graduate students.

Scientific Education

The bills in question also provide for a non-incremental tax credit for contributions to institutions of higher education for faculty wages and graduate student scholarships and loans. We have reviewed this proposal with colleagues at various AAU institutions and my colleagues believe the objective is laudable indeed. The faculty shortage in engineering and computer science is nothing short of alarming. It is I think significant that the companies that have caused the shortage by hiring faculty and young Ph.D's away from universities now propose to make amends.

The only reservation we have about the proposed tax credit for "scientific education" is that it may divert corporate charitable gifts from other purposes such as scholarships or the general endowment to this new cause. Our reservations, however, pale in the light of faculty and graduate student needs. We can indeed support this provision of the bill.

In conclusion, we commend the sponsors of this legislation for their approach to meeting critical national needs for equipping public schools with computers, for expanding the equipment contributions provisions of ERTA-81 and most of all for the non-incremental tax credit for industrial support of university research.

Dr. OLSON. On behalf of the university community, I commend Senators Danforth, Bentsen, and Chafee for their support of the principle.

Many Members of Congress and more than a few college presidents think that ERTA-81 authorized the tax credit that we seek for industrial expenditures on universities' basic research. That confusion, of course, makes our job more difficult. But as we all know, ERTA-81 also authorized an incremental credit that is intended to increase total industrial R&D expenditures. What we seek is a nonincremental credit that will encourage industry to spend a little more on university research and perhaps the cost of spending a little less on in-house research. A flat or nonincremental credit is not intended to produce greater amounts of research. It will provide a tilt toward basic research. Company decisionmakers debating between short-term applied research and long-term basic research will know that they can earn a credit indefinitely for their support of basic research; whereas, the money spent on applied research will increase their base period expenditures and make it more difficult for them to earn credits in the future. Just as the energy conservation credit encourages people to insulate their homes, so this credit will encourage industry to support more university basic research.

Because of the confusion over ERTA-81 and the university credit, I have spent a fair amount of my time on what a nonincremental credit is and what it might do.

I shall devote my final minute or 2 to answering the questions: Why should Congress pass a tax incentive for companies to support university basic research? What is the national interest? I think the people in this room understand the importance of basic research. Without a storehouse of fundamental knowledge, there can be no new technologies. Without DNA or the discoveries that led to the transitor, there would be no biotechnology or micro-electronics. Basic research is fundamental to industrial innovation, to corporate competiveness, and ultimately to America's balance of trade. It seems to me that the national interest is clear. But there is an additional public benefit. The Federal Government annually spend about $4 billion on university basic research, but the country really does not benefit until the newly discovered knowledge is transferred to the marketplace and to the health scientists' repository of proven medical treatment and cures.

Technology transfer is accomplished in many ways, but it is accomplished perhaps most effectively when university and industry scientists work together on cooperative projects; projects that could quickly multiply when this legislation is passed. The logical query, of course, is: If there are so many advantages to basic research, why do companies need a tax incentive? Why don't they invest on their own? Despite all of its potential benefits, basic research is a risky business, comparable perhaps to the risk in drilling for oil. ERTA defines "basic research" as "any investigation for the advancement of scientific knowledge not having a specific commercial objective." With that as the legal definition, it is understandable that companies may be reluctant to invest. Excluding basic research expenditures from the rolling base has the same theoretical purpose as the oil depletion allowance. It reduces the cost of the dry hole, or, in our case, it reduces the cost of basic research funding that has no commercial utility.

To summarize, a flat credit will encourage industry to support more basic university research. Increased corporate support of basic research is in the Nation's best interest because it will enhance industrial competitiveness of the country's balance of trade and it will improve technology transfer. The credit will reduce the risk that companies incur when they invest in basic research. Thank you very much for this opportunity to testify.

Senator DANFORTH. Thank you. Mr. Scheier?

STATEMENT OF STEPHEN SCHEIER, APPLE COMPUTER, INC., CUPERTINO, CALIF.

Mr. SCHEIER. Thank you, Mr. Chairman. My name is Steve Scheier. I am the project manager for Apple Computer's Kids Can't Wait program. Apple Computer and I certainly appreciate the opportunity you have given us to testify this morning.

I am going to confine my testimony to the computer donation provisions that are located in both bills. We certainly support the other provisions that are in both pieces of legislation, but in order to best utilize my time at this point I am going to confine mv comments to the computer donation programs in the bill.

Basically, we very much support the provisions that are in the legislation, and we feel that it is important to encourage the use of computers in schools. As you are probably aware at this point, Apple Computer has already embarked on a computer donation program within the State of California. We have recently offered to provide to approximately 9,000 schools in the State, both public and private, kindergarten through 12th grade, a single microcomputer system for their use. This is something that we would like to do nationally, but we need a bill that will provide us with the necessary ability to do that. I would like to comment on the two pieces of legislation that are before us.

Before I get into specific concerns, however, I would like to take a moment to clarify some of Mr. Chapoton's remarks, specifically those remarks that have to do with our costs. Mr. Chapoton is correct in terms of the cost relating to the manufactured equipment, but there are many other costs that are involved within the cost of this program that his analysis does not reflect. Our California program is going to cost the company approximately $1 million after tax. And for this donation, schools within the State will receive approximately $21 million worth of hardware and software. So, in other words, his analysis does not consider the other costs that we have to incur in order to make that program work such as distribution, staff and collateral purchases. It is not I can assure you an easy processs to distribute that amount of machines to that number of schools and do it in an efficient and responsible and comprehensive fashion.

So Apple conceptually supports the two bills that are in front of us today. One need only to look at yesterday's Wall Street Journal to see that while schools certainly want computers, that they are often unable to receive them, and that there is a considerable disparity between those who have access to this technology and those that don't. We would like to do something to mitigate that situation. And we believe that both of these bills would help to do this. However, we have some specific concerns regarding the training language that are in both of the bills, specifically the language in S. 1194 which requires a 3-hour orientation. I should point out that in order to receive a computer, within our California program, schools have to take an orientation that will be provided by approximately 140 retail dealerships. So it is not our intention to avoid an orientation, but rather to insert orientation language in the bill that will enable us to provide a sensible orientation to the schools, an orientation they will profit from, but not necessarily a 3-hour orientation.

Some of our dealers might provide even more than a 3-hour orientation. Some might provide less than 3 hours. But we believe the orientation we are providing will be valuable to them. We don't want to be held to a artificial three hour standard.

In addition, we have some concern regarding what constitutes "sufficient orientation," and the fact that we might have to negotiate with upwards of 80,000 to 90,000 schools as to what a sufficient orientation entails. In California, for example, we have stated to our dealers what a sufficient orientation in our mind consists of. We have stated to the schools what they should expect from our dealers so that no party in this transaction will be unaware of what they will be receiving. Our dealers have accepted those provisions. They are willing to provide that type of orientation. The schools will know what the orientation consists of. But I think we would have a difficult time negotiating with individual schools as to what a sufficient orientation might entail.

Finally, were concerned by the wording in the bills which state that we make a" teacher proficient in the use of computer technology in a direct education of students." We are not educators. Our dealers are not educators. So it is unlikely that we would be able to make teachers proficient, nor do we actually understand what the term means. But, as we mentioned earlier, we are willing and we are going to insist on providing an orientation to schools throughout California.

The other concern that we have regards the 50 percent assembly requirement. We are uncertain—and this is in S. 1195—about the specifics of that or the intention of that language. We believe that the assembly requirement in S. 1194 would allay some of our fears on this issue. For example, we are unsure if the language in S. 1195 would insist that we manufacture the microprocessors that are in our machines. We do not do that. There are certain materials we buy and then we assemble, but we do not manufacture that equipment. So we would be certainly more comfortable with the language that is in S. 1194.

There is one caveat that I would like to insert for possible inclusion into the legislative language, which is that computer companies which manufacture CPU's should be allowed to donate monitors and receive a full deduction. We, as a company, and there are many other companies who are in the same situation, do not manufacture certain peripherals that are part of our family of products. We do not, for example, manufacture monitors. We buy monitors.

They are tailor-made for us, but we do not manufacture them. So we wanted to insert that, if possible.

Senator **Danforth**. I am going to have to cut you off, sir, Mr. Scheier.

Mr. **Scheier**. Sure.

Senator **Danforth**. Thank you very much. Mr. Bottoms?

[The prepared written statement of Mr. Scheier follows:]

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STATEMENT OF
STEPHEN SCHEIER
PROJECT MANAGER FOR APPLE COMPUTER'S
KIDS CAN'T WAIT PROGRAM
BEFORE THE SUBCOMMITTEE ON TAXATION AND DEBT
MANAGEMENT OF THE COMMITTEE ON FINANCE,
UNITED STATES SENATE ON S. 1194, THE "TECHNOLOGY
EDUCATION ASSISTANCE AND DEVELOPMENT ACT OF 1983"
AND S. 1195, THE "HIGH TECHNOLOGY RESEARCH
AND EDUCATIONAL DEVELOPMENT ACT OF 1983".
May 27, 1983

I'm pleased to have been asked to comment on S. 1194 and S. 1195 which are before the Subcommittee today. I would like to explain Apple's California Kids Can't Wait Program, of which I am the project manager, in order to provide some experiences and insight that may be applicable to S. 1194 and S. 1195.

Kids Can't Wait is a program to provide computers to schools. It was first conceptualized in 1981 by Apple's chairman, Steven P. Jobs, and California Congressman Fortney H. (Pete) Stark. In early 1982, Mr. Stark introduced a measure that would have provided a liberalized tax deduction to scientific equipment manufacturers who made product donations to elementary and secondary schools. This bill basically extended an already existing law which currently provides for an identical deduction for donations to institutions of higher education. Senator John C. Danforth soon after introduced the Senate version of this bill. The federal measure, despite strong congressional and Administration support, was caught in the press of last minute legislative deadlines and ultimately did not pass.

However, in California, a similar bill, A.B. 3194, was approved by the Legislature, and was signed by Governor Brown on September 29, 1982. This legislation provides a tax credit equal to 25% of the fair market value of computer equipment donated to public and private schools in California. The computers must be used for the education of children. Neither institutions of higher education or preschools are eligible to receive equipment under the parameters of this program. This legislation expires on June 30, 1984. As a result of this legislation, Apple planned a California donation program, which will cost us approximately $1 million after tax. We are willing to make this investment because we believe that schools need computers and do not have the funds to buy the number they require.

However, S. 1194 and S. 1195, as currently written will not allow Apple Computer to offer the same program to the rest of the country that it is now providing in California. The major detriments are the training requirements contained in both bills and the 50% assembly requirement contained in S. 1195.

First, let's address the training requirement. Apple Computer is a manufacturer of computer equipment. We are not educators and our dealers are not educators. Both S. 1194 and S. 1195 require the taxpayer to make a teacher proficient in the operation of the property in the direct education of students. It is not appropriate for us to take on this task.

In addition, such requirements make large donations impractical. It is burdensome for a company to give large amounts of equipment and also make large numbers of teachers proficient in using computers in education. We are willing to provide an orientation for teachers as described below. We are doing that in California voluntarily, as there is no training requirements in the California statute. Our dealers will be providing the following orientation:

1. Overall non-technical explanation and set-up demonstration of the Kids Can't Wait system components.
2. Power on/off and booting the system.

3. Proper diskette handling and back-up procedure.

4. Brief explanation and boot-up of software.

5. Overview of the information available in the operating manuals.

6. Explanation of the 90-day service warranty and optional warranty program.

7. Keyboard demonstration.

Apple is also providing its participating dealers with a 20-minute VHS orientation videotape which will briefly describe the basic concepts listed above, and will ease novice computer users into the world of personal computers. Our dealers will then be able to explain these concepts in more depth. This videotape is not intended to supplant but rather to supplement the orientation our dealers provide.

Our dealers fully understand the requirements we have just delineated and are prepared to provide these orientations. It should be noted that many dealers have said to us that they will provide an even more detailed orientation than we are requesting. You should be aware that the orientation that our dealers are providing is far more than our average purchaser receives.

We believe the above is all that can be expected from a manufacturer, and we would not be able to provide more. Thus the three hour training time requirement in S. 1194 and the requirement that individual training agreements be worked out with each school, as included in both S. 1194 and S. 1195, are impractical and would preclude us from participating.

With regard to the 50% assembly requirement in S. 1195, we believe that this requirement is unnecessary and that the assembly requirement in S. 1194 is sufficient. The 50% requirement adds a great deal of uncertainty. At what level of integration does one measure whether a part is assembled? Does one look at semiconductors, or printed circuit boards? Based on past history, we know the Treasury Department will take several years to issue a regulation on this matter and it is very likely that the regulation will interpret this provision very strictly. Since we cannot conceive of a situation where the added 50% requirement will prevent an abuse of this proposed law, we recommend it be eliminated. If this provision is not eliminated, then many companies, including ours, will be unsure of whether they qualify, and as a result, the amount of donations and the effectiveness of this bill will be greatly reduced.

Having commented specifically on the provisions of S. 1194 and S. 1195, I would like to discuss the need for computers in schools and the operation of our California Kids Can't Wait program. The importance of increasing computer utilization in our schools is acknowledged by most members of the educational community. This attitude exists because parents, teachers and administrators believe that in order to prepare their children for a technological future they must provide a way to further their understanding and utilization of computers. In addition, they believe that their own professional futures might be linked to their understanding of this new technology. This belief has fueled an educational interest level that has seldom been seen. One example of this fierce commitment to understanding computer technology is that by June 30, approximately 20,000 California teachers and administrators will have taken computer training provided by the State's Teacher Education and Computer Centers (TECC). This number represents 11% of the state-wide school faculty population. This is a remarkable achievement for a program that has not even been operating for a year. (Apple has decided to aid the TEC Centers by donating five complete personal computer systems to each of the fifteen centers).

Despite these advances in computer awareness, there is still a perception that a gap is steadily widening between those that have access to this technology and those that don't. In a 1983 Infoworld article, author William Puetz discusses the issue. He claims that, in an era "when a computer sits on every desk, it is unlikely that any (child) without computer experience will be able to successfully compete for the high level careers." He asserts that if this technology is not made available to everyone " . . . that the only children able to achieve familiarity with computers will be those of parents wealthy enough to support their quest for knowledge." He concludes that, "computer literacy can mean significant and valuable alterations to our future, but it will be positive development only when it is available to all."

Puetz' warning is given further credence by a 1982 California State Department of Education report which implies that access to microcomputers in our state is still limited. The report indicates that:

- 29% of the elementary schools in California have a terminal or microcomputer.
- 50% of the elementary schools that have a terminal or microcomputer can provide only fifteen minutes of daily instruction to each student.
- 78% of elementary school students have never used a computer.

Despite the gains made in this area over the last several years, there is still a tremendous need to expand the number of microcomputers in our schools.

This is where Kids Can't Wait can help. By September 30, 1983, Kids Can't Wait will have significantly increased the number of personal computers in California schools. This program will help to reduce the gap between the "haves" and the "have nots" because each participating school will be able to acquire its own microcomputer.

Participation in the California Kids Can't Wait Program will undoubtedly be widespread. The legislation which permits us to make this donation clearly allows all public and private schools in this state to receive our contribution. However, we have decided to extend our offer to:

- Public Schools (kindergarten through twelfth grade).
- Tax Exempt Private Schools With Enrollments of Over 100 Students.
- State-Certified Private Tax-Exempt Special Education Schools.
- Selected Schools Operated by County Offices of Education.

There are approximately 9,250 schools that fit into these categories. Each has been offered the opportunity to participate in this program.

A brief description of our state's education system indicates that California's 7,467 public schools are organized within and are operated by 1,034 elementary, secondary, and unified school districts and the 58 county offices of education. These schools consist not only of the more generally recognized K-12 grade institutions, but also schools that are run for special populations of children, e.g., special education, continuation, vocational and alternative education programs. Within the public school environment districts have the sole responsibility for operating and managing these schools. All public schools that receive permission from their governing boards will be eligible to participate in this program.

The State also recognizes approximately 4,374 private schools. However, 2,836 of these schools have enrollments of less than 100 students. In fact, almost 1,000 of these schools have enrollments of ten or fewer students. Only 1,538 private schools have enrollments of 100 or more students. Private schools are often individual entities and make their own operating decisions.

Despite the fact that Apple wants to provide a personal computer to as many schools as possible, we decided to limit our donation to non-profit private schools with enrollments of 100 or more students after consultations with the California State Department of Education. The only exception to this guideline would be the approximately 200 private special education schools that are licensed by the state to provide instruction to students that can't be accommodated in public schools. The average population size of these schools is approximately thirty students. If we did not provide a computer system to each of these schools we would be excluding an entire class of students from our program.

Apple computer is not the only computer vendor that has announced a computer donation program. On February 23, Hewlett-Packard announced that they would donate a total of 140

HP-86 computer systems to 14 California high schools. The value of this donation is estimated at $714,000. Shortly thereafter IBM announced that they would donate 1,500 microcomputer systems to schools in California, Florida and New York. These units will all be donated to secondary schools. Earlier this spring, Tandy announced that it would offer computer training to teachers throughout the country. Atari has also indicated a desire to donate systems to schools in California, but they have not, as yet, detailed their program. Clearly the California statute has enabled the microcomputer industry to make a significant contribution to California schools.

If Kids Can't Wait is as successful as we hope it to be, by September 30, 1983 over 9,000 elementary and secondary schools will have additional access to personal computer technology. For those schools that already have access to this technology our donation will only speed their attempt to expose their children to its applications. For those schools who don't possess any personal computers, our gift is considered an unexpected blessing in a time of fiscal stringency. In fact, in light of our state's severe fiscal plight, we consider our program, under which we have offered to donate approximately $21 million of personal computers quite a bargain when examined against a state cost of approximately $4 million. (If fewer than 9,250 personal computers are accepted then the state credit will, of course, decrease. We do not expect every school to accept our offer. They must decide whether they can make use of our donation).

Some individuals have agreed that AB 3194 and its companion federal measures are little more than elaborate marketing schemes which will be paid for by the government. This is simply not true. If it were, we would ask why haven't other vendors as aggressively pursued this opportunity. The truth is that the program we have proposed is not a profit producer as some have indicated. Apple may ultimately derive some marketing benefit when today's secondary and elementary school children are ready to purchase computers. Or we might benefit if their schools bought additional products. But if increased sales were our primary goal, we would be far more certain of an immediate reward if we allocated the $1 million cost of our California contribution program to our advertising budget. This is probably even more true when we examine the anticipated $10 million cost of a national Kids Can't Wait program.

Apple has already sent its offer to the 2,000 administrative units that represent the 9,250 schools we would like to participate in Kids Can't Wait. The system we have offered them includes:

- Apple //e Personal Computer
- Disk Drive
- Monitor
- Apple Logo Software

All of these products are our latest models.

In addition to the personal computer system delineated above, Kids Can't Wait will also send each school additional materials. These include, for example, the 1983-84 Sterling Swift Educational Software Directory, brochures on computer usage in schools published by the International Council for Computers in Education and Applesoft Basic Programmer's Reference Manuals. We are also very pleased to inform you that 28 of the nation's top educational software vendors have agreed to participate in our program by issuing certificates that will enable participating schools to receive substantially reduced prices on software and books. These are new products that are currently being sold by these manufacturers.

The overall success of the Kids Can't Wait Program depends upon a three-way partnership between Apple, our dealers and the participating schools. Our dealers are particularly critical to the program because they will provide the initial introductory orientation which enables a school to receive their personal computer system. Apple was very pleased to receive the support of approximately 85% of our independent California dealer base representing 140 locations.

Apple has a strong commitment to providing orientation with each Apple //e. A school will not receive its Kids Can't Wait bundle without first attending a Kids Can't Wait orientation session. It is important to understand the logistics of this program in order to understand the necessary commitment of the manufacturers and to understand why additional training requirements, as imposed by S. 1194 and S. 1195, would make such a program impractical. Below is a brief sketch of our California program.

1. Apple publicly announced Kids Can't Wait on May 11.

2. On May 11, Apple sent Kids Can't Wait information packets to all public school district superintendents and all eligible private school administrators. This packet includes:

- Invitation letter
- A list of Kids Can't Wait participating dealers
- Kids Can't Wait Flyer
- Donee (Administrative Unit) Acceptance Statement
- List of Member Schools Form
- RSVP card (Southern California only)

3. On May 11, Apple sent all public and all eligible private schools:

- Invitation Letter
- List of Kids Can't Wait participating dealers
- Kids Can't Wait Flyer
- RSVP card (Southern California only)

4. Between May 12-June 10 the public school districts and private school administrative units send Apple the list of schools they approve to receive a personal computer system. Only those schools will receive a Kids Can't Wait

system. The schools will also return to us the Donee Acceptance Statement in which they agree to:

- not exchange or sell the donation for other goods or services.
- only use the donation for the direct educational use of children.
- not to group the products in one facility. Each donation must be permanently assigned to an individual school.

5. Schools in Southern California that have their district's approval will be asked to attend an Apple sponsored meeting to discuss the program, receive their additional material and to select an orientation appointment with the dealer of their choice. These meetings will be held starting June 13. Schools which do not come to the meetings will sign up for orientation directly with a dealer and will be mailed the supplementary material we have prepared for them on June 24.

Schools in Northern California will sign up for orientation directly with the dealer of their choice. They will be mailed their supplementary material on June 10.

6. Every individual school that has been approved to participate in Kids Can't Wait will receive an Orientation Certificate that may be redeemed for an orientation session through a participating Kids Can't Wait dealer. Orientation Certificates will be sent to the schools during the week of June 20.

7. Orientation sessions will begin immediately thereafter. This is the key part of the program. Our dealers are responsible for organizing and conducting these orientation sessions. They will provide orientation in groups as well as on an individual basis.

8. When an individual brings in their Orientation Certificate, our dealer will:

- Provide the orientation.
- Completely fill out the certificate.
- Send the Orientation Certificate to their Apple Regional Support Center within five days of the conclusion of the orientation.

9. The Apple Regional Support Centers will send the Kids Can't Wait system directly to the school address which is filled in on the back of the Orientation Certificate. The school representative receiving the orientation will also be asked to indicate an address to which we can send a notification prior to the time we ship the product.

The reaction of the individual schools to our program has been very exciting. As mentioned earlier, Apple mailed its offering to California school districts and to private school administrative units during the late afternoon of May 11. By May 16 we had already received several positive responses. By May 24, two weeks after we had announced the program we had received 673 responses representing 3,293 individual schools.

In conclusion, we believe that S. 1194 and S. 1195 can provide the incentive for manufacturers to give needed computers to schools. However, the training requirement and the 50% assembly requirement of S. 1195 would seriously flaw the intended law.

STATEMENT OF GENE BOTTOMS, EXECUTIVE DIRECTOR, AMERICAN VOCATIONAL ASSOCIATION, ARLINGTON, VA.

Mr. BOTTOMS. Mr. Chairman, I am Gene Bottoms, executive director of the American Vocational Association. We appreciate the opportunity to present our views to you and the subcommittee. I will direct my comments toward S. 1194 and S. 1195 and I will try to summarize my points there.

We believe that both of these bills will encourage public corporations a critical problem. As we move advanced technology into the workplace, it is changing the knowledge and skills that workers need and is, in fact, rendering some of our vocational technical programs obsolete. Throughout the testimony I have presented evidence of the obsolescence of instructional equipment and programs, a difficulty of getting staff in many of the particularly advanced technology areas. That problem will add to another problem we have.

You have heard an awful lot about the shortage of math and science and engineers in this Nation and the comparison with Western Europe and Far Eastern countries. You can make similar comparisons in the advanced level technical and skilled areas. We have similar shortages there and there is considerable data to support that. If you talked to production managers, they are going to be concerned about individuals who can install, who can operate, who can maintain, and who can make application of the advanced technology available in this country.

James Medoff, an economist of Harvard, points out that since the mid-1970's we have a major mismatch between the people and jobs in the Nation, and that mismatch is growing and there is evidence that supports that. Most of our employment training policies have only focused on the entry jobs at the bottom rung of the job ladder. And while we have shortage at the top of the job ladder, we also have major shortages in the advanced level of technical and skill areas. We believe these two bills will help address that problem.

We particularly support the proposed expansion to the technical equipment area. In appendix A I have listed the high tech areas, the advancing technologies, and their implications for the different vocational areas. We believe there is a Federal role in helping to modernize the institutions in this country that prepare this nation's technical and skilled work force, not only for the new entries but to help many of the structurally unemployed to reprepare themselves for some of these jobs that exist.

There is widespread adequacies in terms of equipment. One of the studies reported on is a lady's study from Pennsylvania that documents that a fourth of their instructional equipment is completely out of date. They also document the cost—and it is in the testimony—of what it would take to bring those programs up to date and develop some new programs in the high tech area.

In addition, I know in your own State the vocational and technical folks have been working with at least one automotive production plant there as they have moved in some advanced automotive areas in preparing people. Just as industries in the R&D area seek out universities, production companies are going to seek out communities that have the capacity to prepare advanced level technical and skilled workers, and they will locate around community colleges in both tech schools that have that capacity.

There is one difference between your bill, S. 1194 and S. 1195, I would like to raise to your attention. And on page 11 I think it illustrates a point there. As I interpret S. 1194, you would limit the technical equipment provisions to only postsecondary institutions. We have a network of about 5,000 or 6,000 key institutions in this country that prepare people to advanced level technical skill areas, and vocational and technical education does not easily divide itself between secondary and postsecondary. There are 30 voc-tech schools in Oklahoma. If you go to Oklahoma, a third of the year it will be postsecondary; the other third in the same classroom will be secondary. In your own State of Missouri you have area vocational schools and community college both of which prepare adults in that area.

So we would hope that as the committee continues its work in this area that rather than focusing on a level of education, we would define those instructional areas where they are secondary or postsecondary, in which skills are needed, and to provide coverage to both of those particular areas, regardless of the educational level.

We do believe that this will encourage public/private cooperation. In Pennsylvania, only 1 percent of the current equipment stockpile in those institutions was donated by private institutions. We believe these two bills will encourage a kind of a horizontal focus between these institutions looking to the private sector and vice versa. The computer provisions will certainly assess us to prepare students in some of the 400 occupational areas in which we prepare students to make application of the computers in those occupational areas.

The staff provisions, particularly as it extends to the high-tech area, Mr. Chairman, you know we have a bill in this country to create booster clubs for football coaches so that we can get the best in the communities. I see the possibility of this bill to have some booster clubs for both tech booster clubs, for high tech, because you cannot hire at a $14,000 salary an advanced level electronics technician that is going to prepare high-tech people. Thank you, Mr. Chairman.

Senator **Danforth**. Thank you, sir. Mr. Thomson?

[The prepared written statement of Dr. Gene Bottoms follows:]

STATEMENT

OF

DR. GENE BOTTOMS

EXECUTIVE DIRECTOR

OF THE

AMERICAN VOCATIONAL ASSOCIATION

BEFORE THE

SENATE SUBCOMMITTEE ON TAXATION

AND DEBT MANAGEMENT

CHAIRMAN

THE HONORABLE BOB PACKWOOD

MAY 27, 1983

Mr. Chairman and members of the Committee: I am Gene Bottoms, Executive Director of the American Vocational Association. I am pleased to be here today to testify in support of Senate Bill 1195, the "High Technology Research and Education Development Act of 1983," which has been introduced by Senators Bentsen, Chafee, and Symms. AVA feels that S 1195 is an important piece of legislation which will encourage public-private sector cooperation in meeting serious needs that confront our nation's economy and her productive capacity.

The application of advanced technology with its new equipment to the workplace is changing the knowledge and skills that workers need. As seriously, it is rendering a portion of the primary mechanism to train these workers - our nation's vocational-technical education programs - obsolete. Curriculum, laboratory equipment, and instructors have become out-of-date for the modern workplace and a major effort utilizing the resources of both the public and private sector will be needed to rebuild this important national infrastructure.

Advancing technology did not cause this situation by itself. The cut-back in federal support for vocational education, compounded by tightened state and local budgets have created a situation where institutions that deliver vocational-technical education in this nation (community colleges, area vocational-technical schools, comprehensive and general high schools) do not have the necessary resources to modernize programs, including instructors, in line with the requirements imposed by expanding technology in the workplace.

The situation presents some startling contrasts. Arthur D. Little reported that companies spent $22 billion in 1982 for automated manufacturing equipment and that figure will increase to $98 billion by 1992. However, federal expenditures in real dollars for vocational education have actually declined and state and local resources have not been able to make up the loss.

The seriousness of the problem is apparent across the nation:

- In Pennsylvania, a total of 53 percent of the tools and equipment used in vocational programs is over 10 years old.
- In New Jersey, the shortage of qualified teachers in technical areas such as computer science has meant that people with minimal experience have been employed in some secondary programs - sometimes with few other qualifications than owning a home microcomputer.
- In Oregon, $9,764,000 is estimated as necessary merely to maintain existing equipment in secondary and postsecondary vocational-technical programs, while $33,146,000 is needed to bring programs up to industry standards.
- The postsecondary area technical school at Staples, Minnesota, recently advertised nationally for a robotics instructor and obtained only five applications. With a salary of $30,000, it is difficult to compete with industry.

- The Kansas Community College Association indicates that $5 - 10 million is required to upgrade its vocational programs with state-of-the-art equipment.
- In Texas, $10 million was requested for equipment for secondary "new or redirected units" this year. $5 million was obtained for use over a 2 year period ($2.5 million per year).

A disasterous form of economizing is frequently being practiced when no other alternative seems available. It is often less expensive for institutions to continue offering outdated programs than it is to retool laboratories, staff, and equipment to meet rapidly-changing workplace needs. Consequently, a larger and larger gap is being created between the knowledge and competence required on the job and those actually possessed by individuals.

This gap raises particular concern when it is translated into its effect upon the American economy and the economy's incumbent impact on our nation's people. The U.S. productivity growth rate has lagged behind foreign competition for more than a decade. Harvard economist, James Medoff, calculates that as much as 60 percent of the drop-off in productivity growth may be due to a "Labor Market Imbalance" - a misfit of people to jobs. It is critical that, as jobs are changed and updated with new technology, workers also receive the training and education they need to respond to these new demands and challenges. In particular, at least some workers need the advanced-level skills necessary to translate the new technologies into productive applications, while all need enough familiarity with them to employ them comfortably and effectively. Competent instructors and up-to-date training equipment are essential components of this process.

Much has been said recently about public-private cooperation but little has actually been done to meet the problems I have described. In fact, an overwhelming proportion - over 90 percent - of private contributions have gone to colleges and universities. This has not been accidental since tax incentives have encouraged these donations while not rewarding contributions to other institutions.

S 1195 offers a structure for promoting the joint efforts of both the public and private sectors toward upgrading and strengthening vocational programs to the extent necessary to build a competent, highly-skilled workforce. While we do not expect that S 1195 can solve all the problems, we do think it offers one concrete way that local private sector employers and schools can work together to help some vocational programs make needed improvements. In the remainder of my statement, I will identify the provisions in S 1195 we want to see kept in final legislation and why we feel they are critical.

TECHNICAL EQUIPMENT NEEDS IN VOCATIONAL PROGRAMS

As we interpret S 1195, Section 174(b)(1) and 174(c)(2)(B), charitable tax deduction credits would be provided to enhance the quantity and quality of equipment and services being used for teaching purposes in secondary schools offering specified vocational programs, in area vocational schools as defined in P.L. 94-482, and in technical institutes and community colleges. The particular programs eligible for these credits would include those preparing students for computer occupations, engineering technologies, electronics-related jobs, trade and technical positions involving the adaption, installation, operation or maintenance of automated industrial equipment, medical and health-related occupations, and agricultural equipment and instrumentation positions.

We believe these provisions will promote several important results:

1. Improving the quality of selected secondary and postsecondary vocational-technical programs,
2. Expanding the capacity of institutions to prepare new entrants as well as displaced workers for the workplace in areas where shortages exist today,
3. Enhancing the capacity of institutions and employers to work more closely together in preparing advanced-level, technically skilled workers,
4. Providing recognition to a network of institutions that are crucial to this nation's economic and defense goals.

Widespread Inadequacy of Equipment in Vocational Programs

Numerous sources emphasize the fact that equipment serving existing vocational education programs is not current and at the level of industry specifications. The state of Maine's finding that the equipment in its vocational programs is at least 8 to 20 years old is not unusual. Consequently, it is not surprising that programs such as one in Oklahoma have difficulty finding the $3.1 million necessary to develop a machine tool lab which is critically needed.

Dr. Orville Nelson conducted a survey for AVA in the Spring of 1981 to identify the status of equipment in vocational education programs throughout the United States. The survey was particularly designed to identify needs related to keeping equipment current with technology. The questionaire was distributed to subscribers to AVA's communications program for institutions and the selective nature of the sample probably reflected somewhat better than average programs.

The results indicated that recent trends in business and industry toward the rapid adoption and application of robotics and computers in the design, manufacture, and distribution of products was not reflected in the technology used in vocational programs. Fewer than one-half of the respondents were making some use of computer-assisted design and computer-assisted manufacturing. Only nine percent responded they were making extensive use or had developed new programs related to computer-assisted design.

Laser technology and fiber optics, which are being used in a wide variety of applications in business and industry, were not widely used in vocational and technical programs. More than two-thirds responding reported that they were not including these technologies in their programs.

Upgrading Equipment - An Expensive Proposition

Additional findings from Dr. Nelson's study indicate that the lag between the technology used in vocational programs and that used in business and industry is primarily caused by a lack of adequate funds for the procurement of new equipment. Respondents to the survey estimated that it would cost approximately $375,000 to bring the equipment for their technical and Trade and Industrial programs up to date. They reported a large proportion of their tools and equipment over ten years old; the trade and industry area indicated that 52.5 percent of its tools and equipment was over ten years in age.

Dr. Nelson concluded his study with these words:

> Vocational education has been criticized for its failure to keep pace with emerging skills and technology. The data from these surveys on equipment needs indicate that vocational education programs have been suffering from a lack of adequate funds to keep its tools and equipment up-to-date with those used in business and industry. With a critical lack of funding in this area, it is almost impossible for vocational education to plan and provide programs related to new and emerging technologies.

A similar study in Pennsylvania found that almost one-fourth of the tools and equipment in its secondary and postsecondary vocational technical programs was no longer current with the technology used in industry. This study disclosed that over $77 million was needed for updating, 35 million to keep advanced technology tools and equipment already purchased current with the state-of-the-art, $21 million for updating worn-out or obsolete equipment, and $21 million for new, advanced technology planned for 1983-84.

This study concluded with these reflections and cautions:

> Vocational education in the past was able to train millions of students and incumbent workers for both entry- and advanced-level jobs using tools and equipment that were comparable with those used in business and industry. However, with rapid technological advances, increased overhead and current economic conditions, there is some doubt about the continued effectiveness of vocational education. This report can help serve as a basis for the revitalization of vocational education in Pennsylvania with respect to training based on updatged equipment.

These conclusions were verified in information gathered on the other side of the nation. Oregon found that it would take $5 million to merely maintain its community college electronics/electricity standards; $70 thousand to maintain its technical agriculture programs and $383 thousand to make them current in new agricultural technology; $1.3 million to maintain industrial maintenance and mechanics programs and $882 thousand to upgrade them.

These figures are conservative when it is recognized that a computer-assisted design (CAD) system which allows vocational educators to develop the types of competencies and skills used on CAD systems in industry costs at least $300,000 - $400,000. The cost of procuring a robot and developing a laboratory for the study of maintenance and programming of robots requires a minimum outlay of $130,000. In addition, strong electronics and mechanical technology courses would be needed.

maintenance and programming of robots requires a minimum outlay of $130,000. In addition, strong electronics and mechanical technology courses would be needed.

Local Administrators Cite Effects of Equipment Inadequacies

The actual results of the high costs of up-to-date equipment coupled with limited funds is best described in the words of administrators who testified last year in the vocational education reauthorization hearings before the House Committee on Education and Labor:

> The first concern I have at the local level is that the comprehensive high schools in the state of Illinois have been unable to keep up their capital equipment and facilities; and, because of this, are unable to meet the current needs of business and industry. . . Our machine shop is utilizing pre-World War II equipment, and our businessmen in the community are saying that students need skills other than that. I could go on and on, with data processing and electronics as examples."
>
> James Mahler, Lockport Township High School - February, 1981

> Various industries have come to us and wanted upgrading in different areas and, basically, we are unable to provide them the upgrading they need on current equipment. When an industry comes to you, they do not want to be upgraded on yesterday's equipment. We are also being faced with that problem when we turn out our students.
>
> Alex Capdeville, Helena Vocational-Technical Center, Montana

> In vocational education, your credibility is only as good as the quality of the graduates you produce and you have immediate accountability. If that graduate walks in and cannot do the job, your reputation goes. We are out of date in equipment. I have been unable unable to put any significant dollars in equipment for the last three years. You can imagine this in an age when technology is changing so rapidly. The computer area alone absorb, in our institution, $300,000 to $400,000 a year to keep current. In our electronic technologies and our machine technologies, we just frankly do not have the money.
>
> Carroll Bennett, DesMoines Area Community College, Iowa

An Investment in a Valuable Infraststructure

It is critical that vocational programs not only be able to secure and maintain equipment for current programs but also can expand programs in areas of emerging workplace need. The vocational education system represents an established and proven structure which has enabled our nation to provide stable and continuing programs designed to prepare people for employment. In that respect, it is an infrastructure, as important to our nation as are its roads and bridges. Its programs and procedures provide the basis for specialized efforts to respond to particular societal and workplace requirements such as the current needs for advanced-level, technically skilled workers and retrained displaced workers.

Table I illustrates the kinds and numbers of schools which comprise the vocational education enterprise in selected states. The diversity of the institutions offering vocational education is evident in the table. What is less evident is the inter-related nature of the various settings.

Those who usually divide education by levels think they can also divide vocational education that way, but vocational education seldom is categorized that neatly. Many states like Oklahoma have 11th and 12th graders attend their local area vocational education programs where they learn specialized skills with recent high school graduates and returning older workers. In some "secondary" vocational centers, displaced workers take their position along side

Table 1

Institutional Delivery System for Vocational Education

in Selected States

State	Comprehensive High Schools	Vocational High Schools	Area Vocational Centers	Area Vocational Schools	Technical Institutes	Community and Junior Colleges	Total
Colorado	76		7			11	94
Idaho	50			6			56
Iowa	8			26			34
Kansas	24			14		19	57
Louisiana	24		15	43		1	83
Maine	22		25		6		53
Minnesota	28		60	33		17	138
New Jersey	79	37	29			16	161
New York	(375)	(31)	72		6	44	528
Oklahoma	39		31		3	14	87
Oregon	119					23	142
Pennsylvania	(180)	18	79			17	294
Rhode Island			9			2	11
Texas	(250)		152		4	56	462
Total	1174	86	479	122	19	220	2200

Does not include manpower skill centers, adult and other special schools, mobile facilities, or facilities in penal institutions.

Numbers in parentheses indicate estimates used where exact numbers could not be derived.

National Study of Vocational Education Systems and Facilities. October, 1978.

high school students to practice job-related skills. What kind of institutions are these? Secondary? Postsecondary? While not all settings serve these diverse ages, ones which do are likely to become more common in the future.

Thus, we are concerned about a piece of legislation such as S 1194 which restricts its coverage of vocational programs to a certain age level. In contrast, S 1195 recognizes the network of institutions which comprise vocational education programs, using the definition of "area vocational education schools" found in in P. L. 94-492.

Vocational Programs Design Technological Update

The numbers and kinds of vocational institutions are dramatically different from the way they were twenty years ago. In 1960, approximately 600 institutions nationwide could be defined as area vocational centers. (A vocational center is an institution offering at least six vocational programs, including at least four of a laboratory nature.) Today, schools offering such a comprehensive range of vocational offerings include almost 5,000 high schools, 1,500 area vocational high school centers, more that 800 postsecondary vocational and technical schools, more than 1100 technical and community colleges and several hundred four-year institutions which offer associate degree programs in a variety of vocational and technical areas.

Thus, the last two decades have seen a great emphasis in building institutional capacity. With these programs and facilities in place, the challenge now is to modernize programs so they can serve the important role of preparing competent workers that they have in the past.

It is necessary to clarify at this point what we mean by "modernizing" programs and upgrading equipment. First, we do not mean reconstructing full-scale factories in schools or necessarily placing a robot in every classroom. We recognize this is neither feasible nor necessarily desirable. Students can learn equally well and sometimes better with miniaturized equipment, simulators, or industrial trainers.

Second, we acknowledge that, although few of the total number jobs of the future will be "high tech", technology will affect almost all jobs. New equipment will find its way into the workplace and must necessarily find its way into the classroom. Appendix A relates some of the newer equipment technologies that are finding their way into vocational areas.

Recently, AVA conducted a series of High Technology workshops with the Center for Occupational Research and Development. The workshops were designed to raise awareness of the implications of technology on vocational-technical school programs and to introduce some guidelines for rethinking curriculum in light of these implications.

Workshop participants heard an emphasis on broader programs on the secondary and postsecondary levels designed to help students understand the "whys" as well as the "hows" of their technical field. Table 2 illustrates the structure of such a program which would include a series of general laboratories carefully equipped to demonstrate principles of the technical core area. Specialty laboratories with state-of-the-art equipment would be developed to assist students apply the principles learned in the core area to their area of specialization (e.g. robotics, computer, or laser systems).

It is apparent that this model differs greatly from the old crafts approach. Many high-technology occupations have a universal requirement of being able to transfer knowledge from one set of tools and materials to another set of tools and materials. Often this transfer includes changes in energy forms. The skills of high technology are acquired, therefore, by developing an understanding of the physical sciences and their applications. Carefully selected pieces of equipment are essential tools for this instruction. This is what we have in mind when we say "modernizing programs and updating equipment."

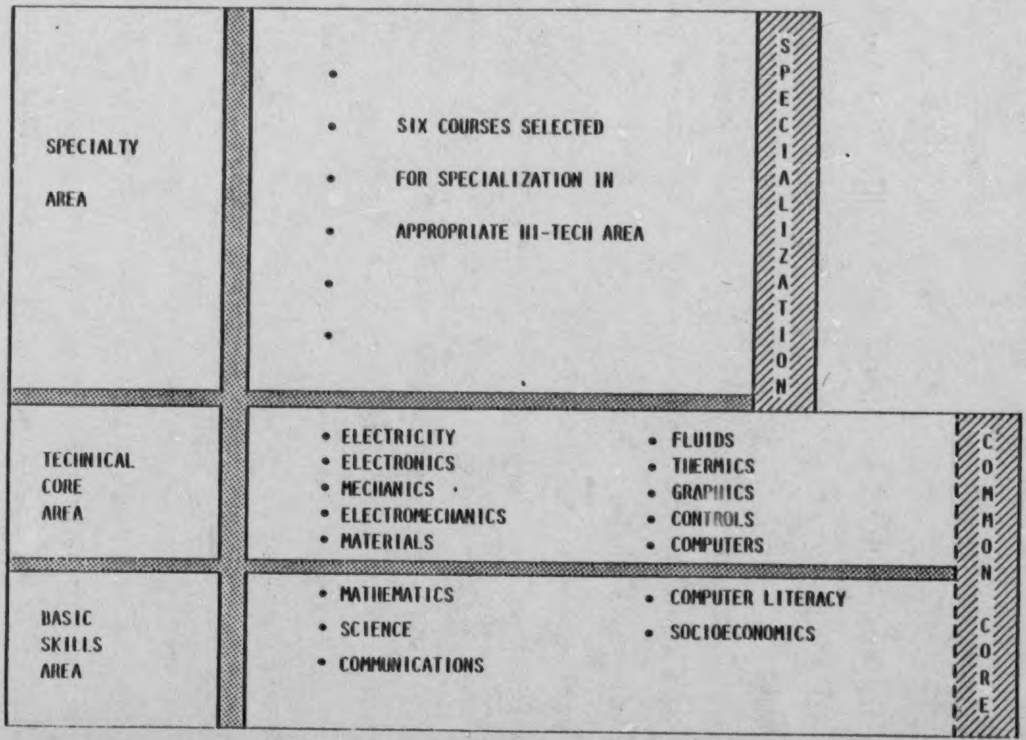
Joint Effort Needed to Address Problem

Thus, the vocational education infrastructure has the potential of providing a strong and effective base upon which to strengthen national economic and defense capabilities through developing a more competent, productive workforce. However, this potential will not be realized when insufficient resources prevent the presence of equipment and tools to do the necessary advanced-level training. S 1195 seeks to address this issue by offering a way where a combination of public and private funds are available to meet the serious equipment needs of vocational programs.

Table 2

PROPOSED HIGH TECHNOLOGY CURRICULUM STRUCTURE

GENERAL PHILOSOPHY



SPECIALTY AREA	• • SIX COURSES SELECTED • FOR SPECIALIZATION IN • APPROPRIATE HI-TECH AREA • •	
TECHNICAL CORE AREA	• ELECTRICITY • ELECTRONICS • MECHANICS • ELECTROMECHANICS • MATERIALS	• FLUIDS • THERMICS • GRAPHICS • CONTROLS • COMPUTERS
BASIC SKILLS AREA	• MATHEMATICS • SCIENCE • COMMUNICATIONS	• COMPUTER LITERACY • SOCIOECONOMICS

It is critical that the private sector become more involved in supporting vocational as well as collegiate programs but legislation has not encouraged and rewarded this support in the past. Although outstanding examples of cooperative endeavors between vocational education and the private sector exist, they are not widespread and do not begin to address the problem of severe equipment shortages in technical areas. The Pennsylvania study cited earlier found that only seven percent of the vocational schools responding listed the private sector as a source and method for obtaining new tools and equipment. The actual dollar amount from the private sector was less than one percent.

During the question and answer portion of the testimony, Mr. Bennett noted his institution has had some success acquiring equipment from industry. However, he mentioned that there were several pitfalls involved in this approach. For example, most small businesses have a very small capacity to give, lease or lend equipment to a vocational program.

Consequently, what it needed is a method for encouraging private support and contributions with a minimum of federal red tape. Although it is impossible to accurately predict the outcomes of any piece of federal legislation, we think the provisions of S 1195 are thoughtfully designed to do just that. Others who are familiar with the feelings of business and industry agree; Bob Craig, Vice President of Governmental Affairs at the American Society for Testing and Development said on behalf of his organization:

> We should like to offer our support for S 1195, the High Technology Research and Educational Development Act of 1983. On behalf of our members who are engaged in employer-provided education and training, we are fully in accord with federal initiatives that are intended to improve the relevance of tax-supported occupational education. In today's world of quickening technological change, it has become imperative that employers and educators collaborate more effectively than ever before and S 1195 should serve as an important mechanism to encourage that collaboration.

We strongly believe that S 1195 would serve to boost the quantity and quality of instruction in vocational technical programs by further developing the infrastructure designed to improve the productive capacity of people. The nature and magnitude of the problems associated with productivity, economic growth, energy, and international competition which our country presently faces suggest that more dramatic changes will be made by business and industry. Thus, the role of the nation's vocational technical programs will be more important than even in preparing people with the knowledge and skills needed to use these changes to the greatest advantage. S 1195 helps assure that the technical tools and equipment necessary for this preparation will be there when they are needed.

MICROCOMPUTER NEEDS IN VOCATIONAL EDUCATION

Section 174 A (c) (1) and (2) of S 1195, qualified computer equipment property and qualified scientific property would vastly expand the access of vocational-technical students to computers for the purpose of:

a. Enhancing overall program effectiveness by teaching basic skills, particularly to those who enroll in secondary and postsecondary programs with limited communicating and calculating skills,

b. Using a self-paced, mastery approach to developing essential technical knowledge,

c. Preparing students to use the computer and available softwear to solve problems in their particular occupational area,

d. Expanding current capacity for preparing individuals as computer operators and programmers in a variety of specialized settings as well as training computer repair technicians.

At this time, there are indications that vocational education students have limited access to computers. As far as we are able to determine, this access varies widely across states and is closely related to the emphasis that has been put on computer acquisition by the state as a whole. For example, there are few computers in Oregon secondary classrooms and even fewer in community colleges. In 1982, there were approximately 328 micro computers in the vocational programs of the states 233 high schools or approximately 1 1/2 per school.

Examination of Oregon community colleges revealed about 125 computers in the 13 schools with most of these heavily concentrated in office administration programs. The few schools contacted last week replied that they had zero to two micro computers in other-than-computer specific classes: two in agriculture programs, one in nursing, one in fish technology, and one in a mechanical engineering course.

Kansas as a state has put a great deal of emphasis on computer acquisition recently. Nevertheless, there is now only one computer for every 125 students, K-12, in state classroom at this time. However, this figure is an average and varies widely across the state. For example, in Hays, there is only one computer for every 324 students K-12 and one for every 202 students, 9-12.

When these overall averages are considered with the fact that banks of computers are often found in specialized computer classes, it is apparent that the average vocational education student in other areas has limited access to the use of microcomputers. However, it is widely recognized that computers will become an integral part of all genereal and technical vocation fields and will serve as a valuable tool for solving problems within them.

Recognizing this potential, the Agriculture Science Department at the Brainard Area Vocational Technical Institute projected the potential for microcomputer use in the Natural Resource Technology Program and the Landscape Technology Program. Using the average of 33 students per year in each of its 14 classes, the total number of student computer use hours per year was projected to be 10,600 hours. The program estimated that twelve computers — an addition of ten to the existing two -- would be needed to provide this experience to its students.

Programs in Delaware, Oregon, Iowa, and Missouri described the essential nature of computer equipment in their automotive maintenance, agriculture, machinist, electronic-electrical, and automated industrial courses. No longer frills, computer driven equipment is integral to the jobs for which their students are being prepared. Computers now direct the functioning of pneumatic and hydraulic machine tools, industrial robots, drafting equipment, and laser-directed sensory equipment for farm operators and machinery . In order to successfully use these tools, students must grasp the basic principles of computer operation and then use them in a particular application.

Harvard professor, David Birch points out that most of the new jobs of the future will be in small businesses. These businesses will rely heavily upon the use of computers to run their operations. In all fields, in most settings, computers will become an inseparable part of the workplace and workers will need to be comfortable using them.

Along another line, microcomputers are also valuable tools for imparting and reinforcing basic and remedial instruction. The Nebraska Indian Community College acquired its first computer in January of this year. Although there are only three computers now in the school, the "Introduction to Microcomputers" class which was developed this term attracted and retained more students than any other of the school's programs. Students have become excited about the editor program that corrects spelling and punctuation and now critique the communications sent out by the school office. The school's director feels that the microcomputers are able to interest and instruct students who have not been successfully reached by traditional means in the past.

We feel that S 1195 would greatly expand the integration of computer application into a host of general and technical vocational offerings.

STAFF SUPPORT NEEDS IN VOCATIONAL EDUCATON

S 1195 appears to give incentives to business and industry to supplement faculty salaries or loan instructors from their personnel for selected vocational and technical areas through the provisions in Section 3 "Expansion of credit for University and Related Activities" (3) qualified organizations and (5) scientific education. Area vocational schools (as defined in P.L. 94-482) and community colleges would benefit from these stipulations which would help them attract and retain well-qualified staff in areas where current salary levels are not competitive with the private sector.

Teacher Shortages - Common Problem in Technical Areas

Serious problems are being encountered by vocatonal-technical programs as they attempt to hire competent instructors in those occupational areas most impacted by high technology. Repeatedly, programs report vacancies, courses not offered, and compromises made when hiring is finally done since they are unable to fill positions with qualified personnel. For example:

- Six of New Jersey's 20 secondary districts offer what may be called true high technology programs. Of these six districts, five need electronics teachers while seven computer science openings presently exist.

- In Oregon secondary programs, six electrical mechanics and six automated industrial instructors are presently needed.
- Although Iowa community colleges have a requirement of three years work experience beyond the journeyman level, it has been necessary to hire people with less experience in the electronical, tool and die, and automotive and diesel mechanical areas.
- At the Nebraska Indian Community College, there has been an instructor turnover every year in automotive mechanics.

It becomes apparent that these reports are not isolated cases when more comprehensive surveys are examined. The American Association of Colleges and Junior Colleges polled the readership of its association newsletter; 89 percent of the 433 respondents indicated there were shortages or critical shortages in computer science instructors in their programs while 67 percent reported shortages or critical shortages in electronic technology teachers. In fact, a general shortage of instructors in most technology-related fields was found including the allied health and fields categorized as "high tech."

Dr. Orville Nelson, mentioned earlier, conducted a Vocational Staff Survey for AVA in the Spring of 1982. Of the 283 schools responding, 52 percent reported problems hiring Trade and Industrial, 20 percent agriculture, 25 percent health occupations, and 22 percent technical teachers.

Low Salaries Discourage Qualified Instructors - Programs Hurt

Low salaries were identified in Dr. Nelson's survey as the primary barrier to hiring qualified vocational teachers. Schools are seldom able to offer individuals trained and experienced in technical areas what they would be able to earn in business and industry. Table 2 gives the starting salaries of teachers in selected states and the amount they would earn in various technical positions in the private sector. Even when schools offer special inticements such as higher-than-prescribed salaries, moving expenses, travel expenses to and from school in the case of the Nebraska Indian Community College, they have difficulty matching the financial benefits of working in business and industry.

Dr. Nelson's survey revealed that the major consequences of failing to employ qualified teachers were 1) reduction in program quality (reported by 59 percent of the institutions), 2) dropping a needed program (24 percent), and failure to develop new program(s) (20 percent).

Furthermore, assistance by business and industry in financing the salaries of vocational teachers was not found to be common. Twelve percent of the schools responding reported they were currently receiving support for teacher salaries with the level typically being 25 percent or less. Three schools indicated business/industry support of 50 or more percent of a teachers' salary.

Joint Investment in Teacher Resources Necessary

Without a doubt, the most important component of successful educational programs are their teachers; yet, the vocational technical programs most critical to our nation's economic wellbeing

Table 3

Starting Salaries for Teachers
in Selected States

State	K - 12	Community College
Colorado	$13,955	
Iowa		21,000*
Kansas	12,946	13,912
New Hampshire	9,000	
New Jersey	12,000	
Oregon	14,820	14,700

* Three years in related work beyond journey status

Starting Salaries for Employment
in Advanced Technology Positions

Industrial Laser Process Technician	$15,000
Industrial Robot Production Technician	15,000
Bionic-Electronic Technician	21,000
Agricultural Business, Technologies	15,000
Computer Programmers	13,000

The Futurist, June 1982

have serious trouble attracting and holding qualified staff. To say "we are eating our seed corn" is a cliche but it accurately portrays the serious nature of the situation which exists in America today as we neglect to invest the resources necessary to supply the teachers needed to train the competent people of the future. Instead, these instructors are pulled into material production and the fruits of their labors are enjoyed today with little thought of the future.

S 1195 offers one way to respond to this problem in a constructive, active manner. I believe that, if the scientific knowledge provision of S 1195 becomes law, local institutions and business and industry will seek each other out and form an ongoing initiative to expand and update the instructional staff of vocational-technical programs.

AUTOMOTIVE AND TRANSPORTATION NEEDS

We appreciate the provisions which support vocational education programs in S 1195. However, I would like to bring to your attention another area not presently included which represents a field of high need and national importance. We hope you will consider including the transportation-related programs now or at another more appropriate time.

In this concern, we include not the operation but rather the manufacture, maintenance and repair of the vehicles and supporting equipment that make up out nation's transportation system. The intense need in this area for skilled, competent technicians was emphasized in the near disaster involving missing valves in an Eastern Airlines jet. Although less dramatic, we live daily with the consequences of technology applied to production in an area for which insufficient numbers of skilled mechanics are available.

John Naisbitt's Megatrends relates the problems plaguing the mass transit systems of several large American cities:

> Both Houston, Texas, and Baltimore, Maryland, have plans to renovate old buses,, at considerable expense, because the new "advance design buses" manufactured by both General Motors and Grumman's Flxible Industries (the only type currently available in the United States) have proved too difficult and expensive to maintain. In Connecticut electrical fires have started in the engine boxes of five Grumman Flxible's buses. Miami's new air-conditioned buses broke down when the air conditioning was turned on. Houston has 150 of the General Motors buses, which have lifts for the handicapped, wide seating, air conditioning, and windows that don't open. The city found itself in a crisis situation last summer when the air conditioning on dozens of the new buses broke down, making them unusable. Authorities solved the problem by removing the windows on forty of the buses, a short-term solution at best.

The unibody construction of automobiles has rendered obsolete over 35,000 autobody shops and their mechanics around the country. These shops and mechanics are unable to repair automobiles with this new construction.

As a result, damaged unibody cars must be written off as total wrecks because they cannot be repaired. This greatly increases the drain on automobile insurance companies, who pass their increased costs onto consumers in the form of higher automobile insurance costs.

State automobile inspections are now conducted almost entirely with computerized testing equipment. Sophisticated hydraulic, electronic, and pneumonic equipment have found their way into autobody shops and are, therefore, needed in training programs to prepare the workers who will use them. "Dedicated benches," in laser beam operators," and "tape operated mills" sit beside wrenches, standard welders and electric grinders. This equipment is costly but is also critical to quality training programs.

Transportation represents an area of high national need which has been heavily affected by technology. Support is needed for training programs here for the same reason as for the areas now included in the bill. We hope you will consider these factors and decide to include transportation-related programs in your mark-up of the legislation.

SUMMARY

In summary, Mr. Chairman, thank you for allowing me to express the views of our members to you and the other members of the Subcommittee. We are delighted to see you consider the expansion of tax credits to cover selected vocational educational areas related to high technology.

The provisions of this bill recognize that not only do we have a shortage of math and science teachers and people such as engineers. As seriously, we do not have enough advanced-level, technically skilled workers and the people needed to train them. These individuals represent a critical link in translating new technology into widespread application for the economic and social good of the nation. If enacted, the provisions of S 1195 would be a step toward addressing these serious shortages.

APPENDIX A

TECHNOLOGIES EXPECTED TO IMPACT VO-TECH OCCUPATIONS

The technologies listed and described below are those which are perceived to have a noticeable impact on vocational-technical occupations. For purposes of presentation, the technological innovations are first listed under their specific occupational cluster areas and then, following the listings, each one is described in a short paragraph. Note that many of the new technologies listed under TECHNICAL and TRADE & INDUSTRIAL may also impact the other occupational cluster areas.

TECHNICAL AND TRADE & INDUSTRIAL

- Process Control
- Microelectronic Monitors/Controls
- Computers/Software
- Optical Data Transmission
- CAD/CAM
- Robotics
- Automotive Services/Electronics
- Renewable Energy Technologies
- Machining
- Welding

Process Control involves automation of simple or complex industrial processes. A simple or singular process sequence is sometimes referred to as a process "loop." In a well-automated plant, the various loops may be integrated into a complex series. Microprocessors with programmable features contribute to the advancement of process control technology. Related terms include "numeric control" and "direct digital control."

Microelectronic Monitors and Controls encompass those components of larger systems which may automatically control parts of the larger system, or which can monitor and display to human operators indications of what's going on within the system and transmit operators' instructions to the system. New graphics, voice recognition and synthesis, and sensor capabilities are among the advances in this technology area.

Microcomputers or Personal Computers, also called "desktop" computers, are by now somewhat familiar to us all. Small-sized and affordable by comparative standards ($5,000 or less will buy a sophisticated system), these machines incorporate many of the logical capabilities of larger computers and can be programmed to perform many of the same sorts of tasks. This is made possible by microprocessor technology. Microprocessors, based on large-and very-large-scale integrated circuits, have sometimes been called "computers-on-a-chip." Microprocessors are used not only in microcomputers but in many other "hardware" systems which can then perform computer-like functions.

The concept of Software is not new, but advanced computer technologies and increasingly sophisticated computer applications have caused software technology to develop and change accordingly. Software refers generally to the computer programs which direct the machine to perform specific tasks. New programming "languages" and techniques, and the development and use of new and important general or special-purpose computer programs, constitute the areas of interest in software technology. The term "software engineering" has come into use in recent years to describe systematic approaches to computer program development.

Optical Data Transmission is a technology which is made possible by advancements in fiber optics--the transmission of light through transparent fiber cables. Light from a point source (normally, a low-power laser) can be used to send the intelligible messages by optical, rather than electrical, impulses. Transmission of such signals over optic cable can have some advantages over electrical wire transmission.

Microprocessors and computer systems form the basis of a set of technologies specifically geared toward the design or fabrication of parts and products. Computer-based design and manufacture is the label used herein to cover these systems known variously as CAD/CAM (computer-aided design/computer-assisted manufacture) and CIM (computer-integrated manufacture), used mainly but not exclusively in the production of industrial parts and part assemblies.

Robotics, the field of interest concerned with the construction, maintenance and behavior of robots, is defined here within the context of the use of robots in industrial or business applications. Robots are defined as reprogrammable, multifunctional manipulators designed to move material, parts, tools or specialized devices through variable programmed motions for the performance of a variety of tasks.

Electronics has emerged as an essential, functional element in automotive design and manufacture, and will greatly alter the skills needed for provision of Automotive Services in the immediate future. Electronic technology now affects or controls automotive components including alternators, voltage regulators, ignition systems, gasoline fuel injection, etc. Automotive design, weight and the materials used in manufacture of parts are changing dramatically with transverse engines, front-wheel drives and the expanding use of plastics and composites.

Renewable Energy Technologies (RETs) are receiving renewed emphasis and application. Sources or methods for the production of usable energy such as solar, wind power and biomass conversion are being studied and implemented in agricultural, architectural and other settings as economic, conservation, and/or fuel-saving measures.

Some of the activities of Machining (such as turning, milling, drilling and boring, grinding, finishing, framing, tooling, etc.) are being revolutionized by the newest technologies. Higher-speed machining, new uses of lasers, microelectronic controls and operator-less manufacturing systems are bringing about improvements which in turn should boost machine shop productivity.

Welding, specifically the two major processes of resistance welding and arc welding, will see changes in application through automation of the standard processes in the near term. Continued automation in the automotive and other large manufacturing plants is predicted. Robots will handle many of the welding jobs formerly performed by skilled workers. Automation of arc welding is also increasing in high-production plants.

HEALTH OCCUPATIONS

- Computer/Software
- Database Systems
- Diagnostic Imaging
- Physiological Monitoring
- Controlled Infusion
- Health Care Delivery Systems

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Database Systems are computer systems and programs which help organize, update and transmit information, particularly selected subsets of information culled from a much larger set called a database. Databases often contain a large number of "records" which are similar in structure but different in specifics. For example, a record may contain a person's name, age, height, weight, and so forth. If a database is formed from such records, the database system may be used to retrieve all or part of this information for a given individual, to list the names of all individuals within a specified age range, to change or update records, etc. The master computer program which facilitates these information transactions is called a database management system (DBMS). When information is handled over long distances in coordinated fashion (such as in confirming an airline reservation or in using a bank's teller machine), the process may be referred to as distributed data processing (DDP).

X-radiation is but one method available nowadays for providing a picture of what goes on inside a living person or animal without physically entering the subject. Diagnostic Imaging technology refers to the various new and developing methods which have expanded the role of the radiologic technician and similar health care workers. Specific methods included under this rubric include ultrasound, computed tomography, and nuclear magnetic resonance, among others.

Advances in microelectronics, sensors, and other instrument components have led to changes in Physiological Monitoring devices and systems, such as might be used in cardiac/intensive care but also in general patient care. These devices and systems include instruments which can monitor or display physiological functions, alerting the health care personnel immediately to important changes and developments.

Controlled Infusion devices are used for precise delivery of liquids (such as drug or nutritive solutions), usually intravenously, to a hospital patient. Advances are making intravenous infusion safer and less time-consuming, semi-automating some of the tasks involved in nursing care.

Health Care Delivery Systems are changing with the times. These "soft" technologies, new and innovative organizational systems for promotion and maintenance of good health, are having impact on the nation's response to changing health costs, demands, and disease trends. An example of a changing delivery system is the health maintenance organization (HMO), a form of prepaid health care plan.

AGRICULTURE OCCUPATIONS

- Computers/Software
- Animal Production
- Pest Management
- Micropropagation of Plants
- Conservation Tillage
- Aquaculture
- Modern Machinery
- Planting Methods/Equipment
- Trickle Irrigation

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Animal Production is a diverse and changing field. New and improved systems and techniques in the general care and husbandry of animals, applied animal agriculture, agriculture disciplines that support animal production, and applications of biological sciences involved in such activities demand new and changing skills and training.

Integrated Pest Management (IPM) is a unified, conservation-oriented approach to the control of animal and plant pests in agricultural endeavors. It involves optimal co-use of different chemical, biological and ecological control methods, with an eye toward long-range impact and cost control.

Micropropagation of Plants With Preplanned Genetic Characteristics refers to the use of tissue culture systems for mass propagation of selected plants by cloning or asexual reproduction. Mass production of new plants may arise from a single cell through miosis or division from leaf stem or root cuttings, meristems, runners or stem tips. Systems of mass propagation may be economical and a unique means of propagating improved disease-free specimens.

Soilless Plant Propagation-Nutrient Film Technique refers to systems and techniques for producing high-value crops or plants without using soil as a rooting substrate. This can be accomplished by hydroponics or soilless culture, or by using a variety of substrates other than soil.

Conservation Tillage is a technology in which the residue of the previous crop is left as a surface mulch through which the new crop is seeded, and weed control is effected by appropriately applied chemical herbicides. It is the most effective soil management practice yet devised as an erosion preventative and is becoming increasingly important for the conservation of soil, water, soil organic matter, and in the use of fossil energy.

Renewable Energy Technologies (RETs) are receiving renewed emphasis and application. Sources or methods for the production of usable energy such as solar, wind power and biomass conversion are being studied and implemented in agricultural, architectural and other settings as economic, conservation, and/or fuel-saving measures.

Following the rapid advancements in horsepower and operator convenience made in the last decade, Agricultural Machinery and Equipment are undergoing even further changes brought about by widespread applications of electronics and computer technology. Many pieces of machinery or equipment will be loaded with sensors, monitors, relays and even on-board computer systems that will enhance efficiency, cut crop losses, and save money.

A blending of electronics and computers will soon make a critical impact on Planting Methods and Equipment. Improvements in planters and seeders will make possible precise seeding depth and spacing and adjustments by the operator in planting patterns to varying conditions even within the same field. New seeding, fertilizing and pesticide application methods are called for with the advent of conservation tillage practices such as low-till or no-till.

Aquaculture embodies those methods and systems for the recent improvement and expansion of the age-old technology of raising aquatic plants and animals in natural or man-made bodies of water as a commercial venture. Included in the "crops" are many varieties of fish (trout, catfish, salmon, etc.) and shellfish or seafood (shrimp, lobsters, oysters, etc.,) or plants such as an algae (used for cattle food) and water chestnuts, etc.

Drip or Trickle Irrigation refers to the type of irrigation system in which, through a series of automatically controlled surface or subsurface water lines and outlets called emitters, water and other water soluble materials such as fertilizers, fungicides and insecticides can be applied directly to the plants, with considerable application cost savings.

HOME ECONOMICS OCCUPATIONS

- Computer/Software
- Household Appliances
- Videotex

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New technologies are influencing the development of Household Appliances. Improvements in energy efficiency, new appliance categories such as convection ovens and induction ranges, and advances in user control capability (for example, the ability to "program" a defrost and cooking cycle within a microwave oven) are of particular interest.

Videotex systems use modern television technology, broadcast and cable, to provide information selectively to subscribers - and sometimes to receive information back from them directly. Videotex is used as a generic term for such systems, and incorporates "teletext" and "viewdata." Teletext systems provide information to the viewer, while viewdata systems, which depend on cable networks, allow information (such as consumer's product orders) to be sent back to the central system by the subscriber at home.

DISTRIBUTION/MARKETING OCCUPATIONS

- Computers/Software
- Database Systems
- Point-of-Sale Equipment
- Inventory Control Systems

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Advances in technologies of Marketing include both technical systems for the advertisement or distribution of products in new and effective ways, and organizational/strategic changes designed to promote the marketing function. The former are illustrated by point-of-sale equipment (product code scanning) and "electronic catalogs," the latter by the intrusion into the automated teller machine services market of nonbanking firms such as department store chains.

Inventory Control Systems are technologies which facilitate the efficient and cost-effective movement of supplies and products to and from warehouses associated with sales or manufacturing firms. Computer technology and related advancements have made possible not only automated retrieval and reordering (e.g., through product numbering and scanning), but also more sophisticated methods of paring down inventories to the amounts needed and the better utilization of computational methods for controlling other inventory costs.

BUSINESS AND OFFICE OCCUPATIONS

- Computers/Software
- Worker Participation in Management
- Inventory Control Systems
- Office Automation
- Word Processing
- Work Scheduling

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Worker Participation in Management refers to organizational structures and functions which involve vocational workers in efforts to improve production or quality. These "soft" technologies include quality control (QC) circles, an important new development, as well as quality of worklife groups and some methods of organization development.

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Office Automation involves the broadening use of computer technology in the office environment. Office automation, however, is not simply the use of computer technology to support office work. Rather, it includes the proliferation of computer-based work stations throughout the office and at all levels from clerk to executive. In addition to the now prevalent word processing functions, electronic mail and filing, data storage and retrieval, "personal" computing including graphics capabilities and interactive on-line communication and data sharing systems are some of the elements of the office of the future.

Word Processing involves the application of computer technology to the typewriting or keyboarding process. It is sometimes described as the key to office automation and is used in the development, production and revision of such materials as long documents, reports, form letters, memos, mailing labels and lists, and other correspondence. Other functions can include calendaring, timekeeping and billing operations. Information entered into a word processing system can easily be edited, revised, reformatted, changed by deletion or insertion of data and generally polished into a better final product without rekeyboarding the entire document.

Alternative methods and practices of Work Scheduling are changing the ways and the places of work. A number of new approaches are being tried in business and industry to adapt to the needs of both the employer and employee. Job-sharing, "flextime," work at home, in satellite centers or in other locations are some of the alternative working arrangements being used.

APPENDIX B

CORD

TYPICAL HIGH-TECHNOLOGY PROGRAMS

- COMPUTERS
- MICROELECTRONICS
- NONDESTRUCTIVE TESTING
- CAD/CAM
- INSTRUMENTATION AND CONTROL
- AUTOMATED MANUFACTURING
- ROBOTICS
- LASERS
- ENERGY CONSERVATION AND USE

STATEMENT OF SCOTT THOMSON, EXECUTIVE DIRECTOR, THE NATIONAL ASSOCIATION OF SECONDARY SCHOOL PRINCIPALS, RESTON, VA.

Mr. **Thomson**. Mr. Chairman, my name is Scott Thomson. I am executive director of the National Association of Secondary School Principals. With 34,000 members we are the largest school administrator organization in the country. Our membership includes approximately 1,000 private and parochial school members. My written testimony is before you and I will make a few summary comments only.

First, I must say that my membership is extraordinarily pleased to see emerging concensus in the country that the primary purpose of secondary schools is for academic instruction for basic skills. And I am also pleased to see the thrust for excellence. Beyond that, I think what is more fundamental is that the Nation is beginning to see more clearly the basic relationship between the quality of its elementary and secondary schools, on the one hand, and the opportunity for economic growth in the future. Certainly, we must have a first-class school system if we are going to have a first-class economy in the years ahead.

While there is a great deal of glamour attached to providing tax incentives for research and development at the college level, I would like to point out that many young people make their decision to go into math and science at age 13 or 14 and 15, and it is the quality of the high school, the quality of the science and math teacher, the quality of the equipment, the encouragement that that person gets, that in many ways determines his or her future. Let me give you one dramatic example.

Twenty years ago I was an assistant principal in a new high school in California. We were able, through the NDEA Act, to purchase and install four computer monitors in our high school for a math lab. Two young men spent a great deal of time in that lab over the next 2 years. As a matter of fact, they seemed to be in there all the time. Those two young men's names were Steven Jobes and Steven Wozinak, who, as you know, are the founders of Apple Computer Corp.

So I am convinced—or at least I would like to believe—that we made a difference in their lives, and that we need those kinds of opportunities for a larger number of people. Incidentally, neither one of those individuals graduated from college or were involved in research at the graduate level. Now, not very young person has that level of special talent. But, even with them the quality of opportunity they get at the secondary school level marks a difference.

I would like to also state that I believe this particular act, 1194, is important substantively as well as symbolically. It is important substantively because far too many people see high schools as being large institutions, whereas, in fact, the medium size high school in this country is about 750 students. And while one additional computer per school may not have a dramatic impact in a school of 2,000 students, it would make a very dramatic impact in a school with 300 or 400 hundred students. So there's a substantive contribution here that we think is important.

Symbolically, I think it is very significant because, as three or four of the other witnesses have said, it is terribly important that we get on with developing close cooperative systems between the private sector and the public sector in this country. We are beginning to do this between education and business in a number of States such as North Carolina where Governor Hunt is providing leadership, and in Florida where Governor Graham is providing leadership. We must continue to do this across the 50 States. And I believe that this act, if passed, would be very symbolically important, an indication, an example of the kind of cooperation we expect.

S. 1194 happens to coordinate with other initiatives that the NASSP is taking. We have asked Senator Glenn to sponsor S. 290, and, of course, that bill provides tax incentives for the private sector to provide jobs in high-tech industries, during the summer for science and math teachers so that they might work in their field during the summer to supplement their income, rather than to work at MacDonalds or drive a cab or something like that. Also we believe that the specifications in S. 1194 are adequate, both in regard to equipment, memory, and software, and so forth.

Let me close by saying that as a layman I really don't see the revenue costs to the Treasury in this particular bill, at least in the short term. The reason I see no revenue penalty is that the demand for microcomputers in the secondary schools is much greater than the money available to purchase them. And so basically we are talking about increasing the market volume, not decreasing the amount of dollars or the tax income to government from those dollars. We are simply saying that more computers will be out there. Those that the schools have the budget to buy, will continue to be purchased. This, then, is an add-on to normal purchasing.

I would like to express my appreciation and those of our 34,000 members, Mr. Chairman, for your support of this bill.

Senator DANFORTH. Thank you very much.

[The prepared written statement of Mr. Thomson follows:]

Testimony

of

SCOTT D. THOMSON, EXECUTIVE DIRECTOR
NATIONAL ASSOCIATION OF SECONDARY SCHOOL PRINCIPALS

Before the

SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT

of the

SENATE FINANCE COMMITTEE

on the

TECHNOLOGY EDUCATION ASSISTANCE AND DEVELOPMENT ACT OF 1983
(S. 1194)

May 27, 1983

Mr. Chairman, members of the Committee, my name is Scott Thomson, and I am Executive Director of the National Association of Secondary School Principals. Our organization is made up of some thirty-four thousand principals, assistant principals and other building-level administrators in secondary schools across the United States. As such they are on the firing line every day in public and private schools alike trying to meet the educational needs of our youth, in difficult and rapidly-changing times.

As almost every educational study has concluded recently, one of the most serious educational needs of students in the era which we have already entered is for some level of computer literacy. By the year 2000, that need may well stand in a position equal to the more traditional need for language literacy which has long been a major objective of our educational system. Indeed, if one thing can be identified as the key to the new age of electronic technology in which our students will find themselves, it may well be a basic familiarity with the electronic computer.

It is this objective which we enthusiastically supported last Session in the Technology Act of 1982, and we were greatly disappointed when it failed to achieve passage in the Senate after receiving strong support in the House of Representatives. This year, therefore, we are delighted to see the revised and broadened legislation before this Committee early in the Session, and sincerely hope that it will achieve the support necessary for swift approval here, so that it may reach the floor of the Senate without delay.

The expansion of the bill to include contributions of other kinds of scientific and technological equipment to institutions of higher education can only be regarded as an important improvement in recognition of the need to increase and upgrade educational opportunity for math, science and engineering students at these more advanced levels. Our own concern, however, and therefore our emphasis, must be upon the original concept of encouracing private industry to contribute computers and computer-related hardware and software to secondary schools for instructional purposes.

It was, perhaps, inevitable when legislation was initially introduced last session that some would misunderstand, and view the bill as one which would primarily serve the purpose of computer manufacturers, perhaps even one particular manufacturer with which the proposal was originally linked. Those misunderstandings should, by now, have been put to rest, and the legislation that is before this Committee now is the stronger for it. It clearly makes possible the donation of equipment by any manufacturer, while also drawing the specifications for such equipment tightly enough to make certain that the equipment eligible for favorable tax treatment will also be of a kind which will provide maximum opportunity to the students it is intended to serve. It must be current equipment, and not something the manufacturer might want merely to dispose of. The new bill also mandates that the company seeking to avail itself of the benefits of the law must not only include the ancillary equipment necessary to make the basic equipment useful, but also the software and the training necessary to enable school staff to use it properly for instructional purposes. We believe that some of the new provisions in the bill represent a vast improvement over the original proposal introduced last year, and hope that these improvements may aid in eliciting the support necessary to achieve prompt passage in both Houses of the Congress this year.

Before closing, I want to say a few words in support of the method by which S. 1194 seeks to provide the important aid that it offers. Clearly, some of the primary purposes of this bill could be achieved merely by the usual kind of federal financial grant program by which funds were appropriated by the Congress and parcelled out by the Department of Education, through the states to local schools and school districts. We believe, however, that in this particular case, if in no other, the approach taken in S. 1194 is far superior to the usual grant program, and provides, perhaps, a model for still other programs for improving American education in the last two decades of this century. For this approach is one in which private industry and the schools can draw closer together in a cooperative effort, an effort which may yield benefits that will go much further than the original objectives of providing badly needed technological equipment to the schools and universities of our nation.

By providing a vehicle for cooperative effort, S. 1194 establishes a model for cooperative efforts which are badly needed if we are to mesh our educational and industrial establishments in one process designed to meet the future needs of both our youth and our nation. Students both of our educational and our industrial systems have recently tended to look to foreign shores to find models for Americans to emulate. And, of course, we should always be ready to understand and to adopt promising new ideas developed and tested anywhere in the world. But I am one who still believes that the essentials required for continuing leadership in science, technology, and even industrial productivity are, as they have always been, right here at home, if we will but organize them properly, and apply ourselves to using them.

I believe that the opportunity is here and it is now for education and for industry to pool their resources and help each other to solve their problems by a new kind of cooperative effort. This kind of effort is well represented by S. 1194, and I urge the Committee to support and approve it without delay.

I will be happy to answer any questions you may have.

Senator **Danforth**. Dr. Olson, there has been so much comment and literature about the fact that we in the United States tend to be short-term planners. Our industry is interested in next quarter's profit and loss statement rather than something that will produce growth 5 years, 10 years down the line. If that comment is true then it would seem that with respect to research spending there would be a natural predisposition on the part of American business to spend money on applied research and to underspend on basic research. Is that a concern of yours, and is that a concern which you think would be addressed by this legislation?

Dr. **Olson**. Senator, indeed it is a concern. And one of the great problems with basic research, of course, is that it needs to be an ongoing kind of activity. And, in one sense, it may have no ending. There needs to be a continuing search. For that reason, the credits provided and the encouragement provided in these bills would seem to us to be of great importance in furthering the kind of support that is essential. Support that is turned on one year and turned down or off the next is not particularly productive.

Senator **Danforth**. In other words, the University of Missouri, for example, has to live more than 1 semester or 1 year at a time?

Dr. **Olson**. Yes, indeed, and in all of its areas, but particularly in the area of research. Continuing support is of the utmost importance.

Senator **Danforth**. To what extent are universities supported by the business community as opposed to simply the alumni? Is there a growing trend or a diminishing trend?

Dr. **Olson**. I think there is a growing trend in all kinds of institutions, particularly in the research institutions. We are seeing cooperative endeavors as between industrial labs, business labs and university researchers. So it is a growing practice. And one of the great benefits to be derived from the legislation which you have introduced would be that in a sense it would continue the encouragement and institutionalize the support.

Senator **Danforth**. Now some people would say, well, this is a negative trend rather than a positive one; that if the business community is involved in financing research, contributing to the universities for research, that somehow jeopardizes the independence of the university on balance. How would you assess the pluses and the minuses of the business community being increasingly involved in the academic community?

Dr. **Olson**. Of course, there are concerns, and legitimate concerns, that there may be undue influences on the university's research. But, generally speaking, I think the universities around the country are working out protocols and arrangements for relationships which preserve the essential integrity of the universities' research mission, and at the same time provide a legitimate kind of expenditure for business. I think the pluses far outweigh the minuses.

Senator **Danforth**. Now, Mr. Thomson and Mr. Bottoms, in education today at the elementary and secondary level and also the vocational educational level, we are moving dramatically away from the old slate writing—what was it called, the McGuffy Reader? That kind of thing—to the use of equipment. Are we not? I mean, a school now without substantial equipment—computers, particularly, in the elementary and secondary schools, and beyond that, scientific equipment, including computers, but other things as well. This is more and more an integral part of education. Is that correct?

Mr. THOMSON. Yes, it is. Most high schools now have, as part of their curriculum, computer literacy. That word gets tossed around, but basically it simply means an understanding of how to program computers at the simple level and what the limitations and possibilities of computers are. We need more hardware to accomplish that goal to have that goal as a part of graduation requirements in most schools.

Mr. BOTTOMS. Senator, in vocational and technical education it is a fundamental. It is essential to teach the technical knowledge and skills that are needed. And particularly the computers can be used to teach an awful lot of the related theory that is core to many of the technical areas, where it could be individualized, and the student can be recycled until they master that technical knowledge base.

Mr. THOMSON. We don't even know what all the possibilities are, but, for example, at Lyons Township High School, in suburban Chicago, the school has over 100 microcomputers. And because they have an imaginative English department and someone that can program, they are teaching English composition now through the word processing capabilities of the micros. It goes on and on. The possibilities are tremendous.

Senator DANFORTH. This equipment is expensive, isn't it?

Mr. THOMSON. A microcomputer is only $2,500 to $3,000. A printer, $1,500. It is not expensive in an individual sense, but, collectively, if you could buy 5 or 10; given the limited budget, it becomes a big item.

Senator DANFORTH. And finding money for education now is not said to be the easiest pursuit in the world.

Mr. THOMSON. It is difficult at best.

Mr. BOTTOMS. Throughout the testimony, Mr. Chairman, we have identified the difficulties that several States are having in getting funds to replace obsolescence in equipment. It is a major problem, and it is a major cost factor in the modernization of these programs.

Senator DANFORTH. You are in pretty good shape at the University of Missouri financially, aren't you? You never concern yourself about money.

Dr. OLSON. I am sure that question was not to provoke a long speech on my part. [Laughter.]

As is true of many State universities, we are having very serious difficulty. The States are finding it difficult to appropriate adequately for their institutions. And I think that anything which encourages non-State support is bound to be beneficial. I am particularly pleased with the way in which your legislation, for example, encourages non-State support.

Senator DANFORTH. Mr. Scheier, what would be the effect of 1194 with respect to your company and its participation in helping schools, colleges, universities? Can you state for us what it would do? Would you be doing the same thing anyhow without the legislation? Would it have some practical effect?

Mr. **Scheier**. No, Senator. It would be impossible, frankly, for Apple Computer to conceptualize the program such as we are contemplating. We could not donate upwards of 80 to 100,000 microcomputers to schools within the Nation if we did not have this legislation.

Senator **Danforth**. 80,000 to 100,000 computers, microcomputers. That is the Apple computer.

Mr. **Scheier**. What we are donating in California is the Apple // e, a disc drive monitor, Apple logo software, and other brochures and materials that I think the schools will also find valuable. We also have reached agreement with approximately 30 educational software publishers to have them supply software to the schools at substantially reduced prices for a limited period of time, and each of that will go to each school.

Senator **Danforth**. So the software program, plus the 80 to 100,000 units.

Mr. **Scheier**. Well, assuming one per school—and there are approximately 100,000 schools in the Nation, perhaps a little bit more, perhaps a little bit less—we are talking about one machine for each of those institutions, yes.

Senator **Danforth**. One for what?

Mr. **Scheier**. One machine for each of those schools, for each of the schools in the nation.

Senator **Danforth**. Your program would be to contribute one machine for each school?

Mr. **Scheier**. Right, if we have a national program. In California, it is one machine per school, in California at this point.

Senator **Danforth**. And but for this legislation you would not do that. Is that correct?

Mr. **Scheier**. No, there would not be any possible way we could do that.

Senator **Danforth**. Now, this bill last year was called generally by its detractors the Apple bill. [Laughter.]

Mr. **Scheier**. Well, it is certainly a moniker we wouldn't want to discourage. [Laughter.]

Senator **Danforth**. The view was that this is a great competitive advantage for Apple. Apple thought it up. Apple is going to go forward. Apple will lock in a whole generation of future customers by contributing one of its computers per school. Why should Congress get itself in the business of trying to create an advantage for one competitor in a very competitive field? Should we be concerned about that?

Mr. **Scheier**. Well, I think you should be, Senator. But as you see in California, other companies are donating equipment to schools. Hewlitt-Packard has said they will donate approximately $700,000 worth of equipment. IBM has recently said that they would donate 1,500 systems in the States of California, New York, and Florida. Tandy has extended an offer of training. Atari has said that they will make some sort of offer, but it has not been forthcoming as yet. So I think that clearly the other companies are participating. Whether they will participate the same extent that we are, is difficult to say at this point. That is certainly an individual corporate decision.

Senator **Danforth**. But you would expect that this would be an act of Congress that would be useful, not only to Apple but your competitors as well.

Mr. **Scheier**. Most definitely. We applaud the efforts that our competitors have made in this arena. We think it is important. I don't think that we are anywhere near the point of saturating elementary and secondary schools in the Nation with microcomputers. And we certainly don't think that it is important necessarily for children to become fluent in the use of an Apple computer, but rather to have some basic ability in understanding this technology. I also think that it is very important that people understand that we understand that there may be some long-term financial benefit to the company. We do not deny that. There very well might be. But in the short term it is going to cost us money right off the top. In California, it is going to cost us a million dollars. We estimate that a national program would cost us somewhere in the neighborhood of $10 million. That is after all the tax deductions have been taken.

Senator **Danforth**. So when Mr. Chapoton says that, in effect, the Government is simply paying for the computer, and there is no risk at all, no participation on the part of the company, your response to that?

Mr. **Scheier**. I would say he has not seen my budget items. He has not taken into account the other items that I have to pay substantially for. For example, my mail costs alone in California are going to run me $85,000.

Senator **Danforth**. All right. Thank you all very much. Now I am told that Dr. McCrea is here and I would like to hear from him at this point.

STATEMENT OF DR. PETER F. McCREA, VICE PRESIDENT AND DIRECTOR OF RESEARCH FOR THE FOXBORO CO., FOXBORO, MASS.

Dr. **McCrea**. Senator, thank you for hearing my testimony out of sequence. An unnamed airline should use some operations research on scheduling.

My name is Dr. Peter McCrea. I am vice president and director of research of the Foxboro Co., which is headquartered in Foxboro, Mass. In 1982, my company had a total sales volume of $603 million. And of this amount, approximately 50 percent represented products sold outside of the United States.

I am appearing before you today on behalf of the Scientific Apparatus Makers Association. SAMA is a national trade association representing this country's manufacturers and distributors of a wide range of scientific, industrial and medical instruments and equipment. In 1979, SAMA member companies expended an average of 5.6 percent of their sales on R&D. This number represented 87 percent of their after-tax profits, or about 150 percent of their capital investments These numbers show that SAMA companies are clearly R&D oriented and R&D dependent.

I am appearing before you today to comment upon the effect that the R&D credit has had upon our industry and my company, and to convey my support for your bill, 738. Shortly after the R&D

credit was enacted into law as a part of ERTA, SAMA conducted a survey of its membership to find out if the R&D credit would achieve its stated objective of increasing R&D expenditures. Results of this survey showed that ERTA would cause an 86-percent increase of the responding SAMA companies to increase their R&D activities, with over one-half of the companies expecting an increase in 1982 beyond that they had originally planned to spend for R&D. These predictions were certainly borne out in the case of the Foxboro Co. Our 1982 R&D expenditures was approximately $43.7 million, which was about 15 percent more than would have been spent without the R&D credit. And we plan to spend more in 1983. In these difficult economic times, with incoming order rates down, shipments down, and profits down, there is a very strong pressure to cut expenditures of all types, including R&D expenditures. Were it not for the R&D credit, we would find it difficult to resist these pressures, never mind increase them, as we should. Thus, I can clearly state that in the case of the Foxboro Co. the existence of the R&D credit is having its desired effect.

New products and new processes do not materialize over night. Competitive high technology products are a result of an evolutionary process which requires the efforts of significant numbers of talented people. In my view, it is necessary to maintain and even increase the levels of R&D spending in my company and in our country if we are to continue to meet foreign competition. The R&D credit is helping to meet that need.

Sir, I am a researcher, not a tax expert. I cannot comment on the various ways to implement incentives or to remove disincentives. I just know that from my perspective, as director of research of Foxboro, anything that you can do to support my request for expanded R&D budgets is good for my company and its competitiveness in the world marketplace and is, therefore, good for our country. I hope that Congress will make the R&D tax credit permanent.

Senator, SAMA thanks you for the opportunity to present these views.

Senator DANFORTH. Thank you, sir.

[The prepared written statement of Dr. McCrea follows:]

STATEMENT OF DR. PETER F. McCREA
THE FOXBORO COMPANY
ON BEHALF OF THE
SCIENTIFIC APPARATUS MAKERS ASSOCIATION

BEFORE THE
TAXATION AND DEBT MANAGEMENT SUBCOMMITTEE
UNITED STATES SENATE

MAY 27, 1983

SUMMARY OF RECOMMENDATIONS

***** SAMA strongly supports S. 738 to make the R&D tax credit permanent.

***** SAMA believes that certain provisions of S. 1194 and S. 1195 will provide needed incentives to attract private industry dollars to universities to assist in the conduct of basic research.

***** SAMA believes that the present moratorium on Treasury Regulation 1.861-8 should be made permanent as is proposed by S. 654.

Mr. Chairman and Members of the Committee:

My name is Dr. Peter F. McCrea and I am Vice President and Director of Research for the Foxboro Company, which is headquartered in Foxboro, Massachusetts. In 1982, my company had a total sales volume of $603 million. Of this amount, approximately 50% represented products sold outside the United States.

I am appearing before you today on behalf of the Scientific Apparatus Makers Association (SAMA). SAMA is a national trade association representing this country's manufacturers and distributors of a wide range of scientific, industrial and medical instruments and equipment. The 180 companies who are SAMA members, many of small or moderate size, constitute the bulk of American industry producing research, laboratory, analytical, electronic test and measurement, and process measurement and control instruments, as well as clinical laboratory apparatus and equipment.

In 1981, the industries represented by SAMA produced and shipped products valued at over $12 billion. Exports accounted for about one-third of total sales, although for some SAMA companies, exports may amount to 50 percent or more of total sales. Since over a third of our industries' total sales are related to exports of U.S. products, it is obvious that a substantial number of the jobs of more than one-quarter of a million U.S. workers employed by our industries are directly dependent upon international trade, and the competitiveness of the United States in world markets. It should also come as no surprise that those businesses which have expended funds on R&D in the past have been successful in the international marketplace today.

Mr. Chairman, SAMA represents an industry which is fully dedicated to research and development (R&D). The products of its members are the result of a continuing commitment of substantial resources to R&D.

To illustrate more closely the relationship of R&D to members' overall business operations, SAMA conducted a survey of its membership in 1979. The results of the survey are striking but not surprising. As had been expected, SAMA's high-technology member companies consider research and development to be the life-blood of their business.

While for manufacturing industries in general, capital expenditures constitute the major company investments, this is not necessarily the case for high technology companies. According to the survey, SAMA members on the average, spend one-and-one-half times as much on R&D as they do on new plants and equipment. Some companies' expenditures are seven and eight times greater.

In terms of after-tax profits, SAMA members spend an average of about 87 percent on R&D.

Of the total amount devoted to research and development by those surveyed - an average in excess of $5.7 million per company annually - 86 percent is devoted to applied product development and 14 percent to research.

The survey results are clear: SAMA companies are clearly R&D oriented and R&D dependent.

I am pleased to have the opportunity to appear before you today to comment upon the effect that the R&D credit of Section 44F of the Internal Revenue Code has had upon our industry and my company, and to convey to you SAMA's support for S. 738, a bill introduced by Senator Danforth which would eliminate the sunset of the R&D tax credit.

NEED FOR A PERMANENT R&D TAX CREDIT

Shortly after the R&D credit was enacted into law as part of the Economic Recovery Tax Act of 1981 (ERTA), SAMA conducted a survey of its membership to find out if the R&D credit would achieve its stated objective to increase R&D expenditures. Results of this survey showed that ERTA would cause 86 percent of responding SAMA companies to increase their R&D activites, with over one-half of the companies expecting an increase in 1982 beyond what they had originally planned to spend for R&D. We are now following up on this survey, in cooperation with the other associations represented here today, to confirm the findings of this early survey.

A recent McGraw-Hill report, "Annual Summary of R&D Expenditures for 1982," supports SAMA's own findings. It shows that high-tech electronics firms increased R&D expenditures in 1982 between 16.1 and 23.2 percent over 1981. The survey report also indicates that these same companies intend to increase their R&D expenditures in 1985 between 29.6 and 46.3 percent over those for 1982.

These survey results were certainly borne out in the case of the Foxboro Company. Our 1982 R&D expenditures were approximately $43.7 million (7.3% of sales), which was about 15% more than would have been spent without the R&D credit. We plan to spend more in 1983 also. In these difficult economic times, with incoming order rates down, shipments down, and profits down, there is very strong pressure to cut costs of all types, including R&D expenditures, never mind increasing them. Thus, certainly in the case of the Foxboro Company, the existence of the R&D credit is having the desired effect.

The importance of this increased R&D activity should not be minimized. My company's short term financial results were clearly affected. Recently announced first quarter profits were only 4 cents per share, compared with 80 cents a year ago. Not all of the decline was due to increased R&D expenditures of course, but the results could have been improved if R&D spending levels were cut.

In my view, it is necessary to maintain, and even increase the levels of R&D spending in my company and in our country if we are to continue to meet foreign competition. New products and new developments do not materialize overnight. Competitive high technology products are a result of an evolutionary process which requires the efforts of significant numbers of talented technical people. The effort required appears to me to have increased geometrically rather than on a straight line. Thus, my firm (and our industry) is faced with an ever increasing need for still greater resources to devote to R&D. The R&D credit is helping to meet that need, and we strongly support legislative efforts, such as S. 738, which will make the credit available to us on a permanent basis.

INDUSTRY-UNIVERSITY COOPERATION

Until World War II, the university was a significant source of the new scientific knowledge and innovative ideas for industry. This is no longer true. In the last thirty years, the Federal government's funding of research at universities has mushroomed bringing government direction and control of work performed by university scientists. Academic researchers are increasingly oriented toward the needs of government. Political considerations are important in "selling" projects to government policy makers, and interest in economic applications has declined.

Academic R&D focuses on basic work. Nearly 70 percent of all university research is basic research. Federal, state and local government funds account for 75 percent of the funding while institutional funds and non-profit institutions supply an additional 21 percent. Private industry is responsible for only 4 percent of the support for basic research.

In fact, one of the most significant changes in the entire process of industrial innovation has been the gradual shift of university research efforts away from industrial needs. The conventional wisdom, over the period of time, has been that basic or exploratory research requires huge amounts of money and time and the private sector simply cannot afford to take the risks of funding it.

As is the case with many SAMA members, Foxboro has had a modest program of cooperation with colleges and universities for a number of years. Unlike most companies, however, some of our activity has taken place with foreign universities. Since the enactment of ERTA, we have refocused our thinking such that our involvement with American universities and colleges is greater than it otherwise might have been. If proposals such as contained in S. 1194 and S. 1195 are enacted, it will make it even more attractive to support university research through research grants and equipment donations, and Foxboro will further increase its involvement with universities in this country.

Mr. Chairman, SAMA's Tax Committee is presently reviewing the specific provisions of S. 1194 and S. 1195. Some of those provisions we have already endorsed, such as those relating to the need to refurbish U.S. educational and research laboratories through expanded deductions for equipment donations. Other provisions of the bills — such as inclusion of community colleges and vocational courses and the donation of computers to elementary and secondary schools — are not the subject of present SAMA policy.

We are especially pleased to note that both S. 1194 and S. 1195 contain provisions which would exclude amounts paid by companies to universities for the conduct of basic research from the "rolling base" which is used to calculate the R&D credit. SAMA supported legislation in the last Congress to accomplish this objective on the grounds that a revitalization of university/industry cooperation in basic research was needed, and all possible incentives should be given to accomplish this objective. We believe this concept is still valid, perhaps more so today than a year ago, and we commend both Senators Danforth and Bentsen for pursuing this course of action.

I must say, however, that overriding these refinements in the present R&D credit, is our concern about its temporary nature. If this Congress takes no other action on it, we hope it will eliminate the credit's sunset provisions.

TREASURY REGULATION 1.861-8

Several years ago, Foxboro established a European Technology operation. We did so for several reasons, including the existence of an infrastructure already in place in England and Holland, the availability of skilled technical people in those countries, and the disincentive to domestic R&D found in some of the U.S. tax regulations, specifically Treasury Regulation 1.861-8. From a policy point of view, limiting applicability of the R&D credit to expenditures in the U.S. is a good thing. However, elimination of disincentives is probably a good idea also, and thus we support S. 654 which is designed to make permanent the two-year suspension of Treasury Regulation 1.861-8.

Our tax experts are always talking to me about the application of the incremental credit rules to university expenditures, the definition of expenditures eligible for the credit, limitations on the deductibility of equipment donated to universities, disincentives found in some tax regulations, and so forth. I really can't comment upon those things, I just know that from my perspective as Director of Research for Foxboro, anything you can do to support my requests for expanded R&D budgets is good for my company and its competitiveness in the world marketplace, and is therefore good for our country. To this end, I hope that Congress will make the R&D credit permanent.

Senator **Danforth**. Dr. McCrea, the one item of contention that was indicated this morning between the Treasury Department, on one hand, and the three people who appeared on the panel that you are now appearing on retroactively——

Dr. **McCrea**. A deferred participant. Senator Danforth. Right. And the one bone of contention had to do with whether the tax credit should be made permanent or whether it should be extended for 3 years, as the Treasury Department suggested. Mr. Chapoton, representing the Treasury Department, stated that he supported and the Department supported the credit and felt that it should be extended for 3 years. The other members of the panel took the position that research and development spending has to be programed over a number of years, and that companies involved in research and development have to make plans, and they have to have some knowledge of what the law is going to be not just 3 years down the road but beyond that as well. Therefore, they believe that it was highly important that the credit be made permanent and not simply be extended by 3 years. Do you have any comments one way or another on that one point of contention?

Dr. **McCrea**. Yes, I do. I believe 3 years is much too short a horizon for any extention of R&D tax credits, and that a 5-, 7-, to 10-year horizon is much more typical of the changes in my industry. And we have to make plans for investments over that time horizon.

Senator **Danforth**. Why is that?

Dr. **McCrea**. The nature of the product, the nature of the investment, and the fact that new processes that are coming on line in our customer companies. We essentially have to put in place the skills necessary to develop instrumentation for those needs. This requires a very longtime delay in the total R&D process.

Senator **Danforth**. In hiring personnel and in buying equipment and so forth?

Dr. **McCrea**. Mainly, finding and training skilled people, and focusing them toward the applied and long-range R&D necessary to achieve our commercial end.

Senator **Danforth**. And whether or not there is a tax credit that you can count on would govern the amount that you would be willing to allocate to research and development in future years?

Dr. **McCrea**. There is a definite correlation.

Senator **Danforth**. Thank you very much, sir. Thank you for fighting your way down to Washington.

Dr. **McCrea**. Thank you for the opportunity to testify.

Senator **Danforth**. The next panel is on S. 1147, Messrs. Cramer, Pitt, and Willoughby. Mr. Cramer?

STATEMENT OF DAVID CRAMER, MANAGING DIRECTOR, PUMP FINANCIAL SERVICES, INC., A SUBSIDIARY OF PHILADELPHIA NATIONAL BANK, PHILADELPHIA, PA.

Mr. **Cramer**. Thank you, Mr. Chairman. My name is David Cramer, managing director of PUMP Financial Services, a subsidiary of the Philadelphia National Bank. PUMP is an acronym that stands for the program to upgrade mortgage portfolios, and as a business it has been operating for about 3 years. PUMP was developed as an outgrowth of the high interest rate environment and the need primarily in the thrift industry to address the mismatch between the long-term, low yielding, fixed rate assets, mostly in the form of mortgages, and the escalating higher interest rates on liabilities. What PUMP does is provide a service to lenders where we conduct a marketing campaign to the borrowers of the institutions, offering a number of plans which include an opportunity to pay off a loan at a discount and the opportunity to curtail the mortgage by making a prepayment at a discount.

Over the last 18 months we have promoted about a quarter of a million borrowers and received about $90 million in payoffs and prepayments from borrowers, which generated about $30 million in discounts. In all the promotions we made to borrowers they were informed of the tax liability that they would incur when paying off the loan at a discount. However, the experience that we had in talking with these borrowers on the telephone, which I personally have some experience with, is that before the IRS ruling and even after it, borrowers were really incredulous for having to make a payment in the current year. For example, the average loan borrowers paid off was about a $24,000 loan with about an $18,000 payment from the borrower. But for the privilege of paying $18,000 now, they were also going to incur a tax liability on an additional $6,000 of discount in the current year.

Most borrowers are used to the tax system as it currently stands where taxes are paid on the receipt of cash in a current year; they were amazed that, having depleted their savings to pay off the loan, they were now further obligated to pay a tax.

A second reason that we feel that the proposed legislation, S. 1147, is important is that it represents a way for the industry to try to work its way out of a difficult situation that it found itself in, partly through deregulation, partly through the movement in market forces. We find that we need to offer borrowers higher discounts than they probably otherwise would need because of the tax liability. It is not unusual, in our experience, that for every three borrowers who initially inquire about paying off the loan at a discount, and who then in the followup piece, find out that they will incur the tax liability, that only two borrowers accept an offer. If we were able to lower the discount to a borrower, and tell the borrower that now you are going to be obligated to pay tax, but only when you receive the cash from the sale of your house, there would be less cost to the lenders in the form of a discount. This would serve two functions. The lenders right now are able to deduct those losses in the year in which they give a discount, and they also have to write off the entire loss, depending on the accounting treatment, which hurts current earnings. If we could lower the discount, there would be less loss to the Treasury from the form of the discount that is deducted, and the lenders would find themselves further on the road to recovery, lessening the chance in the future of FSLIC or FDIC bailouts.

One final point I would just like to make concerns the average loan that we found does pay off at a discount. As I mentioned, it is about a $24,000, 7½ percent loan with just short of 15 years left to run. When that borrower incurs a discount of approximately $6,000, that same loan, if it ran to term, would generate interest deductions, or interest deductible expenses, of almost $16,000. And it seems to me that it is a small price to pay for the Treasury to put off receipt of tax on $6,000 for, whether it is a couple of years or 10 or 20 years until the borrower sells the home in exchange for also giving up the deductions that Treasury otherwise would have lost income on.

Many thanks to you, Mr. Chairman, for your support of this bill and the opportunity to testify here today.

Senator DANFORTH. Thank you, sir. Mr. Pitt?

[The prepared written statement of Mr. Cramer follows:]

May 25, 1983

To: Members, Senate Finance Subcommittee on
Taxation and Debt Management

From: David A. Cramer, Managing Director
PUMP Financial Services, Inc.

Re: Summary of Testimony

- 40 lending institutions have entrusted PUMP with over $5,000,000,000 of mortgage assets. PUMP, at these institutions' request, has made over 1,000,000 offers to 250,000 borrower/homeowners and raised over $90,000,000 in payments from individual borrowers.
- PUMP has spoken directly with thousands of borrowers about mortgages, personal financial planning and taxes.
- Most borrowers cannot believe and have great difficulty understanding why the discounts are taxable. Many reject offers for early payoffs at a discount when they're told the discounts are taxable.
- Church and charitable organizations, which are exempt from taxes, have been enthusiastic acceptors of our offers.
- Senate Bill 1147, by deferring, not eliminating the taxes on discounts strikes a reasonable balance between the revenue requirements of the federal government and the need to restore vitality to the private sector's ability to support homebuyers and the housing industry.
- We endorse Senate Bill 1147 as drafted.

May 25, 1983

To: Members, Senate Finance Subcommitte on
Taxation and Debt Management

From: David A. Cramer, Managing Director
PUMP Financial Services, Inc.

Re: Testimony in Support of Senate Bill 1147
("Mortgage Debt Forgiveness Act of 1983")

My name is David A. Cramer. I am a Managing Director of PUMP Financial Services, Inc., located in Phila., PA. PUMP is this country's largest and best known company offering discounts to homeowners who pay off their mortgages early. PUMP, an acronym for the Program to Upgrade Mortgage Portfolios, has been engaged by 40 lending institutions nationwide. These institutions have asked us to solicit from their borrowers early payoff and other voluntary mortgage alterations which would be both acceptable to the homeowners and beneficial for the lenders. Lending institutions have entrusted PUMP with over $5,000,000,000 of their mortgage assets. PUMP has made almost 1,000,000 different offers to alter existing mortgages to about 250,000 homeowners.

During the last 18 months PUMP, acting as agent, has extended the opportunity to 189,438 homeowners to payoff their mortgages at a discount; 209,593 homeowners have been given the chance to make a partial payment and receive extra credit for that payment. To date we have received on behalf of lenders over $90,000,000 in individual payments from homeowners.

The nature of our program encourages a great deal of one-on-one contact by telephone with borrower/homeowners. Our staff of Mortgage Counselors field homeowners' phone calls and answer a wide variety of questions about mortgages, personal financial planning and taxes. A recurrent theme in these conversations has been homeowners' complaints that the discounts were taxable. Most of them have been incredulous at the prospect of having to pay income tax on the discount. Until IRS Ruling 82-202 last fall we spent hours trying to convince disbelieving borrowers that the discounts were taxable. Even after the publication of the IRS Ruling homeowners still refused to believe that, while they had made an out-of-pocket payment and received no cash in return, they still had to pay taxes. Having personally talked with borrowers on the telephone, I can assure you that a significant number of them declined to payoff their loan after hearing about the tax liability they would incur.

Our company has dealt directly with thousands of homeowners who did not pay off their mortgages early at a discount primarily because the discounts were taxable. We've also noted that a number of church and charitable organizations which, because of their tax exempt status suffered no adverse tax consequences, enthusiastically accepted our offers.

While the unprecedented mortgage rates of the last three years have abated, mortgage lenders continue to be plagued by a maturities mismatch. That is, they have an excessive amount of their assets in low-yielding, long term, fixed rate mortgages. Their liabilities, on the other hand, are increasingly concentrated in short term, interest sensitive money market-like accounts and certificates of deposits. Despite the interest rate relief they have experienced recently, prudent lenders are still working diligently to reduce this mismatch by lengthening the maturities of their liabilities and shortening the maturities of their assets, especially their mortgages. Discounting is a valuable tool in this effort. Sound legislation such as Senate Bill 1147 offers the encouragement necessary for lenders to continue to try to reduce the current mismatch in maturities.

Senate Bill 1147 by deferring, not eliminating, the taxation of mortgage discounts, strikes a reasonable balance between the revenue requirements of the federal government and the need for a revitalization of the private sector's ability to be a strong and active supplier of credit to homebuyers and the housing industry. We support Senate Bill 1147 in its present form and stongly urge you to consider its early passage.

STATEMENT OF THEO PITT, JR., PRESIDENT, HOME SAVINGS & LOAN ASSOCIATION, ROCKY MOUNT, N.C., ON BEHALF OF UNITED STATES LEAGUE OF SAVINGS INSTITUTIONS, WASHINGTON, D.C.

Mr. PITT. Thank you, Chairman Danforth. I am Theo Pitt, Jr., president of Home Savings and Loan Association of Rocky Mount, N.C. And I am pleased today to appear on behalf of the U.S. League in support of the Mortgage Debt Forgiveness Tax Act which has been introduced by you and Senator Tsongas. Revenue ruling 82-202 last November really created some problems for our institutions and for the consumers who are mortgage borrowers. And while we don't question the IRS's application of the law, we agree that the law ought to be changed. In your approach for adjusting the basis of the property by the amount that a discount is offered with the early retirement of that mortgage debt, and then recognizing that debt as ordinary income at such time as the property is subsequently sold, we feel is a sensible way to solve the problem which has been created by this Revenue ruling. And we also endorse the retroactive application of your bill to the home borrowers who have received such discounts in the last years perhaps without the knowledge of the revenue impact and exposing themselves to a sizable tax burden. In many cases, this has bumped them into high brackets for which they didn't even know they were going to find themselves experiencing.

The full statement which I have submitted to the committee details the difficult conditions that our industry has faced and the home financing institutions have experienced over the past 2 years.

I think the media has done a good job in making everybody aware of that situation. Nearly one-fourth of the net worth of our institutions has been eroded away, and almost 800 of those institutions have been merged or gone out of existence. The question is asked, Well why? I think it is very simple. We have been operating at a loss, and the reason we have been operating at a loss is just very simply that we are having to pay in rising interest rate markets more for our deposits than we can earn on the loans that we have on our books. Simply, a negative spread that we have experienced. While it has been negative for several years, it has now turned positive as we have seen market interest rates return to lower levels. But it is still well below where we need it to be for a healthy operation. I think with the current situation with the Federal deficit, we are apprehensive about where interest rates may go in the future. If such happens in a short term, a run up in interest rates could be devastating again.

Improving the return on our loan portfolios is going to take us a long time. Nearly 55 percent of our mortgages now on the books of the institutions are below 10 percent and well over 30 percent are even under 9 percent. One approach to upgrading these loans is to sell them, that is, if we can find a buyer out there to take them off our hands. Another is to encourage the existing borrowers to retire their mortgage before it reaches maturity.

But homeowners recognize that they can invest their disposable income in other ways, and in some cases it appeals to them. So to get those loans paid off, we feel we have to offer substantial discounts. The loss of the mortgage interest deduction figures into that calculation also. Still, I think it is very clear, and has been for a number of years, that most people want to have a debt-free home of their own. An early pay-off has some benefits for us in the financial industry and also for housing in general. It provides some fresh funds for us to lend to put into new mortgages, and in periods of rapidly rising interest rates, it just will help to increase the construction of new homes and facilitate the movement and exchange of existing homes. Funds can be generated through this early retirement of existing debt to keep that local mortgage market functioning.

This position taken by the IRS in Revenue Ruling 82-202 is really a barrier to these early pay-offs, and at the present time it has, for all practical purposes, halted that activity. In a period of declining and stable mortgage rates, early pay-off activity may be modest. But when these rates skyrocket again, the legislation could become essential.

Mr. Chairman, the U.S. League wholeheartedly supports your bill and encourages this distinguished subcommittee and the Congress to move it along as quickly as possible. I have appreciated this opportunity to present our views and look forward to any questions.

Senator **Danforth**. Thank you very much. Mr. Willoughby?

[The prepared written statement of Mr. Pitt follows:]

STATEMENT OF THEO PITT
On Behalf of the U.S. League of Savings Institutions
To the Subcommittee on Taxation and Debt Management
Senate Committee on Finance

May 27, 1983

MR. CHAIRMAN:

My name is Theo Pitt, Jr. I am President of Home Savings and Loan Association of Rocky Mount, North Carolina. I appear today on behalf of the U.S. League of Savings Institutions, where I serve as a member of the Legislative Committee and the Home Ownership Task Force.

The U.S. League, which represents 4,700 savings and loan and savings bank member institutions nationwide, deeply appreciates this opportunity to appear in support of S. 1147, the Mortgage Debt Forgiveness Tax Act of 1983.

Our organization applauds the initiative of Senators Danforth and Tsongas in introducing S. 1147 and their recognition of the problems created for consumers and mortgage lending institutions by Revenue Ruling 82-202. While we do not contest the conclusion of the Internal Revenue Service, applying existing tax code provisions, that discounts offered for early pay-off of mortgage loans must be recognized immediately as ordinary income by borrowers, we agree with the sponsors of S. 1147 that the law needs to be changed. In addition, we find the approach of the bill, which calls for an adjustment of the basis of the property and the recognition of ordinary income at the time of subsequent sale, a sensible way of assuring eventual collection of taxes due.

Furthermore, the U.S. League endorses the retroactive application of S. 1147 to home borrowers who, in 1982, entered into early pay-down arrangements with their mortgage lenders without the knowledge that they were exposing themselves to a sizable and immediate tax liability -- sometimes bumping taxpayers into a higher tax bracket. This is a particularly unfair consequence of the Revenue Ruling, which did not appear in the Internal Revenue Bulletin until November 29, 1982. In that regard, we also commend Senator DeConcini for his introduction of S. 1063, a bill which reverses Rev. Ruling 82-202 as it applies to forgiveness of home mortgage debt for tax year 1982 and postpones its effect for tax years 1983 and 1984. Though we prefer the lasting solution of this issue as provided by S. 1147, Senator DeConcini's bill could provide an interim approach to the unfairness created by the IRS ruling.

(Before proceeding, I might note that our organization conducted a series of clinics for officers of savings institutions in February of 1982 entitled "How to Turn A Sow's Ear Into a Silk Purse" during which accelerated mortgage paydown programs were discussed; the materials at those clinics, as well as articles appearing in Savings and Loan News, our magazine, advised executives to caution customers about possible adverse tax consequences under Section 61 and 108 of the Internal Revenue Code.)

Last fall's Revenue Ruling creates a problem not only for home owners wishing to accelerate the pay off of their mortgage debt, but for our home-lending institutions, as well. The Subcommittee is familiar I'm sure, with the extreme financial difficulties faced by thrift institutions in recent years. One-fourth of the net worth of savings and loan associations -- accumulated over half a century -- disappeared in just two years; industry-wide, our associations lost $4.6 billion in 1981, and despite improving conditions in the fourth quarter,another negative $4.3 billion in 1982. Over 800 institutions either closed their doors or were merged out of existence in the course of the thrift crisis.

If interest rates remain relatively stable at today's levels for the remainder of 1983, our researchers forecast a "break-even" first-half with a slightly positive, perhaps $700 million, result for the year. We remain apprehensive about the interest-rate outlook -- particularly since nearly one-fourth of our deposits have been converted since the first of this year to the immensely popular Money Market Deposit and Super NOW accounts. While the deposit inflows are welcome, we recognize that this is high-cost, current market-rate, potentially-volatile, money. It is, in effect, day-in day-out money, which could leave in pursuit of other investment opportunities if Wall Street rates should start to climb again dramatically.

Though we now have the deposit products to compete with the money markets, we remain handicapped by the legacy of portfolios filled with low-yielding mortgage loans. Eventually, with the broader asset powers provided by the last

Congress in the Garn-St Germain Depository Institutions Act of 1982 and increasing acceptance of adjustable-rate mortgage loans, we should be able to restructure these portfolios. But, at the present time, we must continue to live with some very sobering statistics: 55 percent of our mortgages on the books earn less than 10%, and 30 percent are under 9%. Many of these loans have 20 or 25 years left until maturity. Only 19% of our portfolio mortgage loans are above the current market, which is about 12.5% nationwide.

Overall, our portfolio yield today is 10.6%. At the present time our cost of money is a little over 9.6%, giving us an operating "spread" of less than 1%. While this is a vast improvement over the negative spread of 1.1% at this time a year ago, this is not enough to compete effectively and rebuild net worth. It is far below the historical 1.75% spread between yield on investments and cost of funds under which our institutions operated successfully for decades.

One approach to our low-yielding loan problem, of course, is to package and sell loans to investors. This is not easy to do, especially in periods of rapidly- rising interest rates. And, just as our customers are attracted today by the highly-liquid short-term Money Market Deposit Accounts, investors generally prefer liquid short-term investments -- not long-term mortgages -- in times of economic uncertainty.

Another approach is a "self-help" program where thrift institutions make it attractive for existing long-term borrowers to pay off their loans before maturity, so that they might own their home "free and clear" of debt. Since homeowners recognize that they can invest their disposable income in many other ways, our institutions must offer substantial "discounts" to appeal to those interested in fulfilling their loan obligations early. The loss of the mortgage interest deduction for the taxpayer is also a consideration in the calculation. In periods of high market interest rates the discount must, of course, be proportionately larger to induce the borrower to relinquish the mortgage.

From the point of view of the lender and the housing market, early pay-off has another important benefit.It provides fresh funds for lending to other home buyers. This is particularly important in the periods of rapidly rising rates generally, when deposit flows to traditional hometown institutions are in jeopardy. Funds generated by early retirement of mortgage debt of existing borrowers can be an important factor in keeping a local mortgage market functioning.

The position taken by the IRS in Revenue Ruling 82-202 is a new barrier to encouraging early pay-off of mortgage debt by existing borrowers, particularly those with older, low-yielding mortgages. At the present time it has effectively halted discount programs by lenders. S. 1147 would reopen these opportunities for both lending institutions and their existing borrowers.

In this period of declining and stable mortgage interest rates, early pay-off activity may be relatively modest. But, when rates skyrocket in the future, this legislation could provide important benefits for home borrowers, mortgage lending institutions, and the entire housing sector of our nation's economy.

Before concluding, I would like to make one observation about the revenue impact of this legislation. While we are not aware at this writing of the Treasury's views, we would remind the Subcommittee that encouraging pay-off of mortgage debt involves some compensating revenue gain for the tax collector. The Treasury will gain some revenue through mortgage interest deductions no longer claimed by these home borrowers. That will moderate the revenue sacrificed uner S. 1147 if ordinary income is not immediately recognized on discounts as it would be under a strict application of Revenue Ruling 82-202.

Mr. Chairman, the U.S. League wholeheartedly supports S. 1147, the Mortgage Debt Forgiveness Tax Act of 1983. We encourage this distinguished Subcommittee and the Congress to process this worthwhile improvement in our tax code as soon as possible.

I have appreciated this opportunity to present the views of the U.S. League and look forward to your questions.

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STATEMENT OF KEITH G. WILLOUGHBY, PRESIDENT, MUTUAL BANK FOR SAVINGS, ON BEHALF OF THE NATIONAL ASSOCIATION OF MUTUAL SAVINGS BANKS, NEW YORK, N.Y.

Mr. WILLOUGHBY. Mr. Chairman, my name is Keith Willoughby. I am president of the Mutual Bank in Boston, Mass. I am here this morning representing the National Association of Mutual Savings Banks. We, too, greatly appreciate the initiative by you and Senator Tsongas in introducing S. 1147. We hope it will be successful. We would, however, propose that a more effective approach than the adjusted tax basis of the property would be one of complete forgiveness. I speak from some experience inasmuch as the institution I represent—that is, the Mutual Bank—did take advantage of Dave Cramer's program and we did have some of the reactions that he expressed.

We feel that no matter how conjectural or how far in the future that taxability of the discount may be, it still is going to be an impediment to those who are seeking to prepay their mortgages. Many of these people are middle aged, and for them the possible sale of their home is close at hand rather than far in the future. For anyone, as Mr. Pitt pointed out, there is a sacrifice of flexibility in terms of the future monthly payments that they would have to make, as well as giving up control of their funds. Consequently, the discount has to be greater in terms of its current value than what they believe they might earn at some point in the future. In the case of my institution, in order to get a response that was better than average I think it turned out to be the second best, Nation-wide, of the clients of Dave Cramer's organization—we had to offer a 13 percent effective rate to those who were prepaying their mortgages. This was at a time when our customers could not have put their money to work at a rate of 13 percent. In spite of that, the conversion rate that we had was only 11 percent of our mortgagors. That simply is not enough to have a meaningful impact on our assets structure.

Beyond that, to the extent that the cost of a program of this sort can be minimized in light of the already depleted capital positions in the industry as a whole, the impact on our capital position is reduced. This means that the day in which we might recover fully is hastened.

The Treasury's position on this, as I understand it, is one of just deferring the tax. We submit that this is an instance where subjecting the discount to the tax in effect shrinks the revenue base almost to the point of disappearing. In other words, it is the ultimate Laffer curve. If the discounts are tax free, it is not going to have any material impact on the Treasury's revenues in any case. In fact, I think the Treasury concedes that for most people the $125,000 exclusion for those over 55 means that even at some point in the future they won't be taxable.

Beyond that, as Mr. Cramer pointed out, this will reduce a major tax expenditure—the mortgage interest deduction—and in future years will thereby increase the Treasury's revenues. Finally, it will help to put our industry back into a fully taxable position at some point in the relatively near future, and will provide funds for housing that would not otherwise be available.

We really appreciate your efforts on this. It is my understanding that Representative Shannon is introducing a bill in the House that will do essentially the same sort of thing. We wish you well in your efforts.

Senator DANFORTH. Thank you very much, Mr. Willoughby.

[The prepared written statement of Mr. Willoughby follows:]

Statement
of the
National Association of Mutual Savings Banks
on
S. 1147, Mortgage Debt Forgiveness Tax Act of 1983
before the
Subcommittee on Taxation and Debt Management
of the
Committee on Finance
United States Senate
May 27, 1983

Summary of Principal Points

Although the savings bank industry is experiencing a modest recovery in the present economic climate, it remains very vulnerable to increases in interest rates. The root cause of past problems and current concerns is the industry's extensive holdings of low-yielding, fixed-rate mortgages. Many institutions have embarked on programs designed to encourage borrowers to prepay these older mortgages by providing the borrower with a "discount" for paying off the loan prior to its scheduled due date.

Existing tax policy, however, imposes a serious penalty on the borrowers participating in such programs and thus acts as a major disincentive to consumer acceptance. The IRS has issued rules describing the income tax consequences of a typical situation where a homeowner prepays the mortgage in exchange for a discount, and has ruled that the discount must be treated as taxable income (Revenue Ruling 82-202).

S. 1147 would address this situation by overturning the IRS ruling that the discounted amount is to be treated as income to the taxpayer. The savings bank industry strongly supports S. 1147 and similar legislation to remove the Internal Revenue Code barriers to the successful operation of programs to encourage the prepayment of low-yielding mortgages.

We believe that the preferable approach is to provide complete forgiveness of the discounted amount of the prepayment. This approach would be simple for the lender to explain, the borrower to understand and the IRS to administer, thereby contributing materially to the marketability of prepayment programs.

Statement
of the
National Association of Mutual Savings Banks
on
S. 1147, Mortgage Debt Forgiveness Tax Act of 1983
before the
Subcommittee on Taxation and Debt Management
of the
Committee on Finance
United States Senate
May 27, 1983

Mr. Chairman, members of the Committee, my name is Keith Willoughby. I am President of the Mutual Bank For Savings, Boston, Massachusetts, and am appearing today on behalf of the National Association of Mutual Savings Banks (NAMSB).

NAMSB is the trade association of the nation's savings bank industry. Located primarily in the New England and Mid-Atlantic states, savings banks are community-oriented financial institutions. In the areas where they are most heavily concentrated, savings banks are the largest holders of consumer savings, as well as the dominant mortgage lenders among the various types of depository institutions.

Later this year, NAMSB will be merging with the National Savings and Loan League which represents a large number of savings and loan associations located primarily in the Southern and Western states, and I would like to point out that this statement also represents the views of the National League. The total assets of institutions to be represented by NAMSB and the National League are in excess of $350 billion.

We appreciate this opportunity to testify on S. 1147, the Mortgage Debt Forgiveness Tax Act of 1983, and related bills dealing with the discharge of mortgage indebtedness. Although the thrift industry is experiencing a modest recovery in the current, more favorable, economic climate, it remains very vulnerable to increases in interest rates. The problems experienced by the industry in the high interest rate environment of the recent past and the cause of our continued concern center on our extensive holdings of low-yielding mortgages. The savings bank asset structure, for example, remains heavily concentrated in long-term, fixed-rate mortgage loans acquired in earlier years. Three-fourths of total savings bank residential mortgages bear rates below 10 percent, and more than one-half of our loans have rates below 9 percent. Savings banks need a lengthy period of relatively low and stable interest rates to work off low-yielding mortgages and thereby generate the earnings needed to compete in a deregulated environment.

To augment this effort, many institutions have embarked on programs designed to encourage borrowers to prepay these older, low-yielding mortgages. Under such programs, the lender agrees to accept an amount less than the total due on the mortgage loan if the borrower agrees to prepay the loan in full, or to substantially increase the monthly payments (and thereby pay the loan back sooner). In short, the borrower is given a "discount" for paying off his loan prior to its scheduled due date.

To date, however, such programs have met with only mixed success. In addition to tax considerations which I'll address in a moment, the great disparity between open-market rates and the mortgage portfolio yields that existed during the 1980-82 period tended to discourage both lenders and borrowers. Lenders—already hard pressed—could ill afford to offer the large discounts necessary to attract borrowers into prepayment programs. At the same time, borrowers were enjoying an unprecedented rate of return on their liquid assets and thus were reluctant to give up these yields to "buy out" the principal amount of their mortgages even at a healthy discount.

While it is true that the "gap" between market rates and mortgage portfolio rates has narrowed, this should in no way lessen the important role which prepayment programs can play in enhancing the competitive posture of the thrift industry. To the contrary, the narrower "gap" may well make such programs more marketable, and it should be kept in mind that the restructuring needs of the thrift industry call for eliminating not just low-yielding mortgages, but also those fixed-rate loans that may be in the middle range of investment returns. Thus, the introduction of S. 1147 and these hearings are extremely timely.

These bills address a most critical component in making prepayment programs feasible. It is obvious that in order for a program of this kind to be a success, it must offer benefits to both parties. Existing tax law, however, imposes a serious penalty on the borrower, and in turn, acts as a major disincentive to consumer acceptance. Section 61(a)(12) of the Internal Revenue Code states that the gross income of a taxpayer includes income from the discharge of indebtedness. Section 108 of the IRC provides certain exceptions to this rule, but these do not cover the types of transactions we are discussing this morning. In fact, the IRS has issued rules describing the income tax consequences of a typical situation where a homeowner prepays the mortgage in exchange for a discount, and has ruled that the discount must be treated as taxable income (Revenue Ruling 82-202).

S. 1147 would address this situation by providing an additional exception to the general rule of IRS Section 61(a)(12) and, in effect, overturn the IRS ruling. The savings bank industry strongly supports S. 1147 and similar legislation to remove the Internal Revenue Code barriers to the successful operation of programs to encourage the prepayment of low-yielding mortgages. Such a step not only represents a more logical tax policy, but with banking deregulation proceeding apace, government policy should clearly include maximum incentives for asset restructuring by the thrift industry.

In this regard we do suggest one modification to S. 1147 in order to make such programs truly attractive from a marketing standpoint. As presently drafted, S. 1147 would require the taxpayer to reduce the cost basis of the principal residence in accordance with the discounted amount of the prepayment. This is still too complicated and thus we believe that the preferable approach is to provide complete forgiveness. This approach has the critical advantage of being simple for the lender to explain, the borrower to understand, and the IRS to administer.

Any revenue loss to the Treasury is more apparent than real because the prepayments would not take place or would be minimal if the discounts are taxed. The potential revenues would be in meaningful volume only if they are tax exempt. In other words, any tax would destroy the revenue base. On the other side of the equation, such prepayments will, in the future, reduce the single largest individual tax deduction, that of mortgage interest. Furthermore, such a program will hasten the day when thrift institutions will again pay taxes to the Treasury; it would reduce the possibility that federal assistance would have to be provided to thrift institutions if interest rates turn up again; and, it will enhance our industry's ability to finance new housing.

In conclusion, the savings bank industry greatly appreciates the efforts of Senators Danforth, Tsongas and others to address the present tax obstacle to mortgage prepayment plans. We applaud the initiative of the Subcommittee in calling this hearing, and we strongly support the prompt enactment of legislation such as S. 1147.

Senator **Danforth**. Let me see if we can just spell out for the record what this transaction is and why it has existed. The typical person has a house with a $24,000 mortgage, and that mortgage has an interest rate of 7½ percent. Is that the typical case?

Mr. **Cramer**. That is right.

Senator **Danforth**. The financial institution says that if the individual will pay off the mortgage, if they would pay it off at $18,000, that is the end of it. Is that what happens?

Mr. **Cramer**. Correct.

Senator **Danforth**. Now then as far as the financial institutions are concerned—I don't know who wants to answer the question—but why would a savings and loan, or a savings bank, want to do that? Why would you want to receive $18,000 on a $24,000 debt?

Mr. **Willoughby**. In the hope that the reinvestment of that $18,000 would recover the $6,000 discount. In other words, we could put it to work at current rates, and those rates would be sufficiently higher to recover the loss over a relatively short period of time, and in the meantime put us into a black earnings position.

Senator **Danforth**. So what has happened to the savings and loans and the savings banks in recent years is that they were caught in the squeeze. They had portfolios of mortgages which paid low interest; that they, in turn, had to pay high rates for their money, and they were losing on that transaction. The idea is to be able to get rid of these low interest rate mortgages in order to provide a more profitable portfolio. Is that the nub of it?

Mr. **Willoughby**. Yes, sir.

Mr. **Pitt**. That is essentially it, yes, sir.

Senator **Danforth**. So given that desire to get rid of those low interest paying mortgages, a program was put into effect, Mr. Cramer, that your organization was arranging and promoting to provide for just this kind of repayment. Is that right?

Mr. **Cramer**. That is correct. Our program itself is one for lenders who don't want to mount the marketing campaign and don't have the staff available to do all the follow up with the borrowers. But this type of promotion, of getting borrowers to pay off loans at discounts, is something that our company has done and lenders on their own have done, commercial banks, savings and loans, savings banks.

Senator **Danforth**. When did this occur? Is this a fairly recent development?

Mr. **Cramer**. I think discounting, per se, to the borrowers is not something new. In the past it used to be in vogue during periods of high interest rates. In the mid-seventies, lenders went back to their borrowers with the 5-percent mortgages and offered them discounts to prepay.

Mr. **Willoughby**. It is a very difficult thing for most borrowers, most laymen, to understand, Senator. And one of the advantages of David's company's campaign was that it makes it more comprehensible, and it is more effectively marketed.

Senator **Danforth**. It has occurred in the past, you say.

Mr. **Cramer**. Right.

Senator **Danforth**. But at a time when the S&Ls were in such difficult straights, wasn't there a renewed campaign or a new effort to try to do this?

Mr. **Cramer**. I think, very clearly, in the last several years, in 1981 and 1982, discounting is something that the industry as a whole embraced, just because the outflow of funds into the mutual money market funds was so severe, that as the rates went up, the lenders had to look to the mortgages for the first time as a real source of generating funds. They saw that while one alternative existed to sell these loans off into an established secondary market, which Wall Street and other lenders, and pension funds really run, one would be able to go to a borrower and offer a slightly lower discount than the secondary market would take.

Senator **Danforth**. So you were involved in trying to encourage this discounting of mortgages. At the time that this was begun and the promotion started, was it believed that the amount of the discount was taxable?

Mr. **Cramer**. We found ourselves in a curious position with borrowers. We maintained from the beginning—and I think it is almost 3 years ago that our first promotions went out to borrowers—that the discount was taxable. We also found that we were getting into sticky legal grounds if we said to the borrower, that as a matter of fact, this is taxable. So we always included a caveat and said to make sure you check with your own counsel. Very often we would get into these almost heated arguments with borrowers, who would then come back and say, well, my accountant doesn't think it is taxable. We would say, well then believe your accountant. I did it myself where I called the 800 number at the IRS to say "Is this amount taxable?" A couple of days later a clerk called me back and said, "No, it's not taxable." I got into the same argument with the clerk at the IRS. So at least when that ruling did come out in late 1982, it helped our phone people to at least get off the phone and say, "Look, here is chapter and verse of where the ruling is."

Senator **Danforth**. What was the effect of that ruling on the practice?

Mr. **Cramer**. It did not really change our results, because we had been disclosing the tax liability from the beginning. It did generate a large number of telephone calls from borrowers who had probably not taken advantage of the program anyway. There were articles all over the country. We found that our clients—and maybe Keith Willoughby can speak to that better—did receive a lot of phone calls from borrowers.

Senator **Danforth**. Other than phone calls though, was there an effect on the practice as far as you are concerned?

Mr. **Pitt**. Mr. Chairman, I think that it did have an effect. I cannot speak for the industry, but, in general, I think that just as many institutions tried their own in-house programs. They have tried the PUMPS program and other such similar programs. But I can speak from my own personal viewpoint as to the experience we had. We offered an in-house discount program that we were meeting with some fair success with until such time as we got word of the proposed Revenue Ruling coming down that was going to provide that it was going to be taxable, at which time our results began to drop off substantially when it was a fact accomplished that it would be a taxable income to them. We were meeting with fairly good success prior to that time in getting people to take the discount with the idea that it was perhaps not going to be taxable.

Senator **Danforth**. Did you have the same experience, Mr. Willoughby?

Mr. **Willoughby**. We did make it as clear as we could to people that we felt that it was taxable. We had our own accountants look at it, and they said it was.

Senator **Danforth**. Did that dampen enthusiasm?

Mr. **Willoughby**. Unquestionably. It also made it necessary for us to offer a considerably higher rate. As I said, we were offering an effective rate of 13 percent, which made it very close to break even for us.

Senator **Danforth**. Right. It does seem to me to be an unusual tax policy in a country which we had thought was attempting to encourage savings, and which has a low rate of savings, with an Internal Revenue Code that tends to reward borrowing and encourage saving; to have a policy where somebody wants to pay off a debt, they have to pay Uncle Sam a premium in order to do so.

Mr. **Pitt**. Mr. Chairman, we think that the public policy is already there for this purpose in the case of extinguishing a debt. We think it is just a logical extension to carry it forward in this area, which is so vital to the well-being and the welfare of this country, that being housing and homeownership.

Senator **Danforth**. Yes. Thank you all very much for your testimony. The hearing is adjourned.

[By direction of the chairman the following communications were made a part of the hearing record:]

Rec. 21

ARTHUR ANDERSEN & CO.

100 FEDERAL STREET
BOSTON, MASSACHUSETTS 02110
(617) 423-1400

June 8, 1983

Hon. Robert Packwood
Senate Finance Committee
Room SD-221
U.S. Senate
Washington, D.C. 20510

Dear Senator Packwood:

We are writing with respect to Senate bills which were the subject of a Senate Finance Taxation SubCommittee hearing on May 27, 1983.

We respectfully submit the attached memorandum which describes in detail our comments concerning certain aspects of Senate bills S.738, S.1194 and S.1195 and request that these comments be included in the record of the hearing.

In general, we believe that the proposed legislation contained in all three bills is appropriate and will be beneficial in encouraging research and technological education and will help the United States to enhance its position as a world leader in technological developments. However, in a few limited instances, we believe that certain provisions of the bills may not thoroughly carryout their expressed intent. In addition, we believe there are a few structural errors in one of the bills.

We appreciate your considerations of these comments and would be pleased to answer any questions you may have with respect to the specific items discussed in the enclosed memorandum or the bills in general.

Very truly yours,

ARTHUR ANDERSEN & CO.

By
Charles J. Medallis
Director -
Research & Development
Tax Incentives

JMA

Attachment

I. Introduction and Summary Comments

Presented below are specific comments concerning proposed legislation dealing with expanded incentives for research and development activities. The comments relate to Senate Bills S.738, S.1194 and S.1195.

S.738 proposes to make permanent the credit for increasing research activities which was enacted by the Economic Recovery Tax Act of 1981 (P.L.97-34). We agree with this proposal since a permanent incentive, particularly an incremental one, is much more likely to accomplish the long range goal of increasing and continuing to increase research spending.

S.1194 and S.1195 both propose to expand the scope of existing law dealing with deductions for contributions of scientific equipment to certain organizations and payment for basic research for purposes of the credit for increased research activities. Again, we agree with expanding these incentives in order to enhance the level of primary, secondary and higher education in the United States and to expand research activities and facilities in our colleges and universities. Specifically, with respect to scientific equipment contributions, the proposals should provide significant incentives to potential donors to contribute computers and other scientific equipment to our educational system in order to provide the opportunity for students to acquire and develop skills needed for the development of new technology. The proposals regarding the credit for increased research activities through payments for basic research should be enhanced by the exclusion of basic research from the base-period limitation, the elimination of the prepaid contract research rules, and the addition of payments for scientific education being eligible for the credit.

In general, the bills appear to contain the appropriate provisions to accomplish these goals. However, in a few instances which are dealt with below, certain modifications may enhance the encouraging intent of the proposed legislation.

II. S.738 - Research Incentives Continuation Act of 1983

The bill proposes to eliminate the sunset provision contained in Internal Revenue Code section 44F and make the credit provided by the section (R&D Credit) permanent.

We believe that this proposal is appropriate, in fact, essential to provide the incentive for long-term continued technological advancement of U.S. companies in relation to competitive advancements of companies in other nations. The purpose of a temporary tax incentive is to satisfy a short term or temporary need but, in general, it would not provide for a significant long-term effect. In order for the R&D Credit to encourage U.S. companies to adopt and pursue long-range research programs intended to result in the United States enhancing its position among the technologically advanced nations of the world, a permanent and significant incentive is necessary.

The present provisions which would cause the R&D Credit to expire in 1985 should provide some short-term assistance to encouraging research activities. The fact that the credit will expire may cause some companies to choose to accelerate research projects which are flexible as to timing into the credit period in order to take advantage of the R&D Credit. This type of action may give priority to a project which otherwise may have taken a backseat to another project which would have been of more significant long-range benefit. Where the R&D Credit is a permanent incentive, not only would this type of problem be minimized but the incentive would provide continued encouragement to constantly expand research activities.

III. S.1194 - Technology Education Assistance and Development Act of 1983

A. Section 174A(c)(1) defines qualified computer equipment property that can be donated to secondary schools to qualify for the deduction. The language in this section is very specific in defining the property that will qualify in this category.

Because the definition is so specific, it is possible that present equipment, that should qualify will not qualify and that future technological developments will result in new products that also should, but will not under the rules, qualify for the deduction. For example, it seems clear that desks or stands to hold the equipment will not qualify. More importantly, it does not appear that voice synthesizers, future developments that may take the place of the disk drive as a storage medium, modems, and memory expansion boards/chips would be easily excludable under a reasonable reading of the language of the bill.

This problem could be cured by making it clear that the deduction should be allowed for computers and accessories including, but not limited to, items already listed in the statute. Further, any particular types of items of hardware or software which are not intended to qualify could be specifically excluded.

B. Section 174A(c)(1):

1. Subparagraph (I) mandates that donated property be kept by the recipient for the property's ACRS life.

A number of questions surface with respect to this. First, since the bill specifically permits software to be donated, is the bill somehow making a presumption that software is ACRS property? If so, which ACRS class is the appropriate one? If not, what would be the length of time software must be retained?

From a policy point of view, it may not make sense to require recipients to retain for long periods of time equipment that could rapidly become obsolete. Perhaps three years would be a time period which would satisfy all of the objectives.

By the same token, schools should not be allowed to use donated equipment to raise cash which would not be used to replace the sold property. Therefore, it may make sense to design a provision that would allow recipients to at least "trade-up" existing machines, that may be obsolete, for more advanced versions. Such a change would certainly be consistent with the expressed policy.

2. Subparagraph (J) provides that donated software and ancillary equipment must be compatible with data processors already owned by the recipient.

It may make more sense to make this provision more flexible by allowing a contribution to recipients that will own, pursuant to an existing arrangement, data processors compatible with such software or ancillary equipment within a reasonable period of time.

C. Section 174A(d)(2) specifies that in the case of tangible personal property that is used in the taxpayer's trade or business, the deduction is equal to 150% of the taxpayer's basis in the property (without regard to adjustments under section 1016(a)). Thus, the deduction is equal to 150% of original costs unreduced by any allowance for depreciation.

The Detailed Description indicates that the intent is that the deduction be equal to (1) 150% of original cost, minus (2) total depreciation deductions taken. Under this provision the maximum deduction is 150% of cost and the minimum deduction is 50% of cost.

The actual bill language must be changed to reduce the amount of the deduction by depreciation taken in order to reflect the expressed intent.

D. Section 174A(f)(2) excludes an electing small business corporation from the definition of the term "corporation".

Perhaps it is a policy issue as to whether deductions such as those provided by proposed section 174A not be allowed to individuals, even in a flow-through environment. However, as a result of the SubChapter S Revision Act of 1982 (P.L.97-354), many corporations including computer and computer equipment manufacturers, scientific equipment manufacturers, and software developers can and will avail themselves of the small business corporation provisions as defined in section 1371(b). Accordingly, in order to provide the same incentives to those companies as to regular corporations to support educational institutions through contributions of computer and scientific equipment and computer software, consideration should be given to allowing small business corporations to be considered eligible for purposes of proposed section 174A.

E. Section 2 of the Technology Education Assistance and Development Act of 1983 deletes paragraph (4) of subsections (e) of section 170 and proposes to enact new section 174A.

This leaves section 170(e)(3) in tact. Under the proposed resulting statutory structure it is conceivable that a deduction of an amount as specified therein would be allowed by section 174A as well as a deduction as specified therein by section 170(e)(3). In order to avoid this possible outcome, proposed section 174A treatment could be at the election of the taxpayer or it could be specified in proposed section 174A that any deduction allowed by that section is in lieu of any deduction allowed by section 170.

F. Section 3 of the Technology Education Assistance and Development Act of 1983 provides for an expansion of existing law dealing with payments for basic research for purposes of the R&D Credit as well as for scientific education payments. With respect to this section of the bill we submit the following comments:

1. Proposed section 44F(e)(1) has language which makes it clear that the prepaid rule contained in existing section 44F(b)(3)(D) will not be applicable to payments for basic research or scientific education.

This modificaltion should enhance the basic research provisions in at least two ways. It will eliminate the necessity of potential donor determining the amount of funding a donee would plan to spend in a given year for purposes of determining the amount of the donor's payment. Secondly, it will eliminate a potentially horrendous recordkeeping and reporting problem for the donee to account to the donor on the amount of a specific contribution spent in a given taxable year, which would be particularly onerous where the donor and the donee had different yearends.

2. Proposed section 44F(e)(2) would exclude any basic research or scientific education payments from the base period for purposes of determining the increase in qualified research expenditures.

This provision will certainly create more encouragement for taxpayers to fund basic research and upgrade the research capabilities and facilities of the qualified organizations as well as their teachers education programs.

3. Proposed section 44F(e)(6) provides for two limitations in determining the amount of scientific education

payments which will qualify for the R&D Creidt.

a. Paragraph (B) requires that in order to be eligible any amounts paid as wages must be paid pursuant to a written agreement which obligates the donor to pay the same or greater amount in each of and not less than three consecutive taxable years.

Presumably the intent of this limitation is to provide for an organized approach to funding projects which span a number of years and create a real committment on the part of the donor. This is all well and good except there may be many potential donors who might be willing to make a one year committment but rather unwilling or cannot afford to make a minimum three year committment. One other possibility is that rather than giving a single amount in one year a donor, because of this limitation, will give that same amount but in installments over a three year period which would not seem to carryout the overall intent of the bill.

b. A second overall limitation is contained in paragraph (6)(C) which requires for any amount to qualify for the R&D Credit the total amount in any given taxable year paid for scientific education must exceed the average of all amounts paid to all institutions of higher education which are deductible under section 170 and which are not designated by the taxpayer for scientific education during the three preceding taxable years.

Again there is presumably a policy issue at stake, but, this limitation seems so onerous as to severely limit potential donor participation in this type of funding. In order to derive any immediate benefit of this provision considering this limitation the donor would have to have either little or no base expenditures or be willing to make a major committment to fund these types of expenses.

The wording of the limitation would include amounts paid for basic research in the base period amount. This seems very counter-productive.

Another effect of this limitation is that it would devert funding to scientific education from other activities. Even if a donor were to receive no credit in the current year from designating all of its contributions for scientific education because that amount did not exceed the base, if future amounts are so designated and overall contributions levels are maintained, future credits would be available since the base period would be reduced by the designation to scientific education. It is not clear from the Detailed Description as to whether this is the intent of this limitation provision.

4. Proposed Section 44F(e)(8) excludes small business corporations and service organizations from eligibility for the basic research provisions. Considering the fact that the objective of this portion of the proposed legislation is to generate funding to expand research capabilites and facilities as well as educational programs conducted at qualified organizations, perhaps, it would make sense to eliminate these exclusions which would broaden the universe of potential donors. Further, it may also make sense to expand eligible donors to include partnerships and other unincorporated entities which are actively engaged in a trade or business to expand the universe even further.

IV. S.1195 - High Technology Research and Educational Development Act of 1983

This bill is, for the most part, identical to S.1194 in providing for expansion of contributions of scientific equipment and the basic research provisions of the R&D Credit.

The comments contained in Section III above are also applicable to S.1195. This bill, however, is different in a few respects which merit specific mention.

A. Section 174A(b)(1) includes secondary schools offering vocational education or area vocational schools as eligible recipients of qualified scientific property or qualified services. This provision is broader than its counterpart contained in S.1194 which is limited to institutions of higher education.

We believe that this expanded provision is appropriate in order to provide incentive to satisfy the need for such schools of scientific equipment in addition to computers and ancillary equipment. The programs conducted at many vocational type schools which are not necessarily institutions of higher education are frequently fertile sources of technicians and other educated personnel necessary to the high technology industry. Accordingly, providing incentives for enhancing their educational programs is appropriate in that it will help to satisfy a desperate need for trained technicians in the high technology industry.

B. Section 174A(c)(1)(D) specifies that in the case of property other than computer software the property is at least 50% assembled by the taxpayer.

The question here is to what basis is the 50% applied; cost, value, physical content, etc.

This same comment is applicable to Section 174A(c)(2)(D).

C. It appears that there is an error in the structure of proposed Section 174A in that there is no Section 174A(d) rather the structure goes from (c) to (e).

Accordingly, Sections 174A(e), (f), (g) should be redesignated (d), (e), (f) respectively.

D. Section 174A(f)(2) specifies that a deduction will not be allowed in connection with transfers of qualified computer equipment property or qualified scientific property where such transfers exceed, on a product by product basis, 20% of the number of units of such product sold by the taxpayer in the ordinary course of its business in that taxable year.

The provision as written would apply to transfers of trade of business property as defined in Section 1231(b), which it should not since this type of property is normally not sold in the normal course of business, at least not to any great extent. To impose this limitation on trade or business property would be counterproductive to the intent.

E. In connection with the proposed revisions to subsection (e) of Section 44F contained in Section 3 of the bill, we submit the following comments for consideration:

1. Section 44F(e)(2) contains a cross reference to subsection to (a)(1). Since this refers to the base period computation, we believe that this cross reference should be to subsection (e)(1).
2. Proposed section 44F(e)(3)(A) includes a broader definition of "qualified organizations" than S.1194 in that it includes area vocational educational schools (as defined in Public Law 94-482).

From a policy point of view, is it clear that such a school would conduct the type of basic research that the credit was intended to encourage?

DEERE & COMPANY

JOHN DEERE ROAD, MOLINE, ILLINOIS 61265 U.S.A.

BERNARD L. HARDIEK
Director of Taxes

Statement of
Bernard L. Hardiek
Director of Taxes
Deere & Company
27 May 1983

I am Bernard L. Hardiek, Director of Taxes, Deere & Company, Moline, Illinois. Deere -- or John Deere, as we are perhaps better known -- manufactures, distributes and finances a broad line of farm and construction equipment. We are the largest manufacturer of farm equipment in the world employing some 48,000 people worldwide. Last year, the 3,500 independent dealers marketing Deere equipment registered total sales in excess of $4.6 billion.

We at Deere & Company commend the Senate Finance Committee for the interest shown in the important area of taxation of research and development expenditures. Senators Wallop and Danforth and the cosponsors of their bills have demonstrated an understanding, concern and willingness to work that is especially appreciated. Deere & Company supports S. 654 and S. 738 because the time has come for R&D to be encouraged rather than discouraged by the tax laws of this country. Research and development will lead to increased productivity and will help to achieve noninflationary increases in personal income.

When most people think of research and development, the name John Deere may not immediately come to mind. However, in recent years we have ranked consistently within the top 25 companies in the United States in terms of total R&D expenditures. In 1982, Deere & Company employed over 3,500 people engaged in research and spent $242 million on research and development. Stated another way, Deere spent almost $1 million each working day on R&D. Over 90% of the cost of our R&D was incurred in the United States. We also think it is significant that our Company's investment in research and development has averaged over four cents of each sales dollar in recent years.

Our research covers a broad range of projects. Metallurgists at our research facilities are involved in low-gravity metal research projects, sharing technology with the National Aeronautics & Space Administration for use on upcoming space shuttle flights. Our goal is to develop a stronger iron. In addition, exhaustive and, I might add, expensive, research contributed to the construction of our newly-opened 2 million square foot, award-winning Waterloo Tractor Works. This factory has been recognized as the industry leader in state-of-the-art computer based technology. Effective use of research has allowed us to remain a competitive manufacturer of advanced farm and construction equipment with productive innovations which U.S. farmers, contractors and small business owners find necessary to meet their business challenges.

Most will agree that research and development primarily benefits the country in which it is performed. For this reason, other countries offer substantial tax incentives for R&D performed within their borders. However, until 1981, U.S. tax law acted as a disincentive to the performance of R&D in the United States. This disincentive was the ultimate effect of Section 861(b) of the Internal Revenue Code and Section 1.861-8(e)(3) of the Regulations. This combination of Statute and Regulation required that the cost of R&D performed in the United States arbitrarily be divided between foreign and domestic income even though the R&D was performed entirely in the United States. The R&D allocated against foreign income has the affect of reducing the limitation for foreign tax credits, which then reduces the foreign tax credit allowable if foreign taxes paid exceed the limitation. This increases the total U.S. tax payable. Let me give you an example to demonstrate this point:

Foreign Tax Credit Calculation

Foreign Tax Credit before R&D Allocation	(In Millions)
Foreign Source Income before R&D Allocation	10.0
Foreign Tax Credit Limitation (46% of 10.0)	4.6
Foreign Taxes Paid	4.8
Foreign Tax Credit Allowable	4.6

R&D Allocation under Section 861	(In Millions)
Total R&D Performed in the U.S.	6.0
Foreign Sales as a % of Total Sales	20%
R&D Allocated to Foreign Source Income	1.2
Foreign Tax Credit after R&D Allocation	
Foreign Source Income before R&D Allocation	10.0
Less R&D Allocated to Foreign Source Income	(1.2)
Net Foreign Source Income	8.8
Foreign Tax Credit Limitation (46% of 8.8)	4.0
Foreign Taxes Paid	4.8
Foreign Tax Credit Allowable	4.0
Reduced Foreign Tax Credit Caused by Section 861 Allocation of R&D	
Foreign Tax Credit Allowable before R&D Allocation	4.6
Foreign Tax Credit Allowable after R&D Allocation	4.0
Reduced Foreign Tax Credit	.6

The allocation of R&D against foreign source income results in a reduction of the allowable foreign tax credit by $600,000. This taxpayer's penalty for performing $6 million of R&D in the U.S. is therefore $600,000 in additional U.S. income taxes. If that R&D had been performed in any other country, it would have resulted in no such increase in foreign or U.S. taxes. This is so because no other country besides the United States requires such an allocation or apportionment of R&D expenses. When a taxpayer has excess foreign tax credits, the effect of apportioning R&D performed in the U.S. to foreign source income is the same as disallowing a deduction for the R&D performed in the United States. This provides a disincentive to performing R&D in the U.S., encourages the movement of R&D out of this country, and gives foreign companies a competitive advantage over U.S. companies who perform R&D here in this country. The U.S. Treasury gains only a minimal benefit - a benefit which we believe would be easily overshadowed by the increased taxes due to the Treasury as a result of the increased productivity.

The Economic Recovery Tax Act of 1981 took an important step forward by temporarily removing this disincentive to perform R&D in the United States.

As you know, it suspended for two years the provisions of Section 861 which required the allocation of R&D expenses against foreign source income. However, this suspension expires at the end of 1983. S. 654 would permanently remove the disincentive by providing that no R&D performed in the United States would be allocated against foreign source income. Deere & Company urges this subcommittee to act favorably on this bill. We do have one additional comment of a technical nature regarding S. 654. We believe the Subcommittee should add language clarifying the fact that the bill would only apply to the calculation of the foreign tax credit and would not affect the DISC in any way.

I would now like to take a moment to address S. 738. As you know, the Economic Recovery Tax Act of 1981 included a provision which allows a tax credit of 25% of the increase in the current year's R&D performed in the U.S. over the average of the three previous years. We at Deere & Company view this as a step in the correct direction. Though other countries routinely provide more significant incentives, a permanent credit for even a small portion of R&D expenses incurred in the United States may well encourage some companies who are considering locating R&D facilities in other countries to remain at home. Let me explain.

John Deere, and most other companies who make substantial expenditures for R&D, often must decide where an R&D facility should be established when a need arises for a new facility. Many factors are considered in the study, including the cost of various taxes. Exhibit A, attached, shows the tax cost of locating an R&D facility in the United States compared to Canada. The analysis assumes an initial cost of the facility of $20 million and an annual expenditure of $10 million for R&D. This shows that Canadian taxes would be $14,760,000 less than U.S. taxes in the first year! The dramatic difference in tax is caused by the fact that Canada has recognized the significance of having R&D performed in that country and has provided the following tax incentives:

1. A deduction for the entire cost of the facility is allowed in the first year. In the U.S., it must be depreciated over 15 years.
2. An additional deduction is allowed for 50% of the excess of current R&D expenditures, including capital assets, over the prior 3-year average. In the U.S., no additional deduction is allowable.

3. The R&D credit in Canada is allowed on all R&D expenditures, including capital assets, while the R&D credit in the U.S. is allowed only on direct R&D costs, excluding capital assets, and applies to only the increase in R&D.

The significant benefits available to taxpayers performing R&D in Canada, compared to the U.S., become even more important when one considers Canada's geographical proximity, business environment, language and cultural similarities and economic stability. However, Canada is not alone in encouraging R&D through tax incentives.

- Germany allows a 20% tax credit on the first DM 500,000 and 7.5% on the balance of any amounts spent for assets used for R&D purposes.
- France provides a deduction equal to 10% of the cost of assets used for R&D purposes. R&D buildings are eligible for a 50% special depreciation allowance. In addition, France will pay cash grants for certain R&D expenditures.
- Japan has allowed an R&D credit since 1966. The credit is equal to 20% of the excess of current expenditures over the largest amount of R&D expenditures in any tax year since 1965. Japan also allows a deduction of 40 percent of certain income for companies that receive income from overseas transactions in technical services.

Belgium, Denmark, Mexico, Norway, Spain and Sweden offer similar tax incentives to encourage R&D.

In summary, John Deere believes that it is in the best interest of this country to remove the disincentive to perform R&D in the U.S. which is caused by Section 861 by enacting the provisions of S. 654 and S. 738. The increased R&D and greater productivity which should result, will help establish the framework needed for substantial economic growth.

I sincerely appreciate the opportunity to provide to you John Deere's views.

Bernard L. Hardiek
Bernard L. Hardiek
Director of Taxes

DEERE & COMPANY

Exhibit A

Comparison of U. S. & Canadian R & D Tax Laws

Assume a new $20 million research facility which spends $10 million for R & D each year. Compare locating in the U. S. to locating a facility in Canada:

		U. S.	Canada
1.	Depreciation on facility	$ 2,400,000	
2.	Deduction of facility in year acquired		$20,000,000
3.	Deduct R & D expenses	10,000,000	10,000,000
4.	Additional Deduction Allowable for 50% of the excess of current expenditures over 3 prior years' average		15,000,000
5.	Total Deduction	$12,400,000	$45,000,000
6.	Less Credit allowed below for R & D in Canada		(3,000,000)
7.	Net Deduction	$12,400,000	$42,000,000
8.	Tax Reductions at 46% rate	5,704,000	19,320,000
9.	R & D Credit	2,500,000	3,000,000
10.	861 Effect on Foreign Tax Credit *	(644,000)	-
	Net Tax Reduction for R & D	$ 7,560,000	$22,320,000
	U. S. Net Tax Reduction for R & D		7,560,000
11.	Tax Benefit in Canada in excess of U.S. Benefit		$14,760,000

Analysis of $14,760,000 Benefit

		Canadian Tax Benefit
1.	Timing difference on immediate expensing of building instead of depreciating over 15 years	$ 8,096,000
2.	Deduction for R & D expenses in excess of prior 3 years' average	6,900,000
3.	R & D Credit	(880,000)
4.	861 Effect in U.S. for R & D allocated to foreign source income	644,000
	Total Net Canadian Tax Benefit	$14,760,000

* Section 861 Effect on Foreign Tax Credit
Assume 20% foreign sales and excess foreign tax credits

Total R & D	$10,000,000
Less 30% to U.S.	(3,000,000)
Balance	7,000,000
20% to Foreign	1,400,000
Reduced Limitation (46% of $1,400,000)	644,000

The Foxboro Company

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May 18, 1983

Mr. Roderick DeArment
Chief Counsel
Senate Finance Committee
Room SD-221
Dirksen Senate Office Building
Washington, D. C. 20510

Reference: S654

Dear Mr. DeArment:

I will be unable to attend the May 27 hearings of the Senate Finance Taxation Subcommittee, and would therefore like to submit this letter with respect to S.654. That bill would amend the tax code to treat deductions for research and experimental expenses attributable to activities conducted in the U.S. as allocable to income from sources within the U. S.

Foxboro believes the operation of Reg. 1.861-8 is a disincentive to the conduct of research and development in the U.S. Our own company is a case in point. For many years, we tended to centralize all our R&D effort in the United States. Then in 1980 a decision was made to establish a European R&D operation. The Foxboro Company now has R&D activities underway in its subsidiaries in The Netherlands and the United Kingdom. Our reason for this relocation was a combination of tax penalties and shortages of key technical skills in the U.S. We already had a support infrastructure in place in Europe, and have found no difficulties in directing and coordinating this activity from the United States, thanks in part to ease of communication via telephone, telex, computer links, and personal visits. We believe that when cost differentials become noticeably large, action will be taken to relocate R&D, especially when it is believed that those cost differentials will continue, and especially when the move is to a location where an infrastructure already exists.

Foxboro had excess tax credits in 1979 and 1980, and we would not have had those excess tax credits if our R&D spending levels had remained constant. In fact, the operation of Reg. 1.861-8 was such that in 1979 and 1980 the increase in R&D expense apportioned to foreign source income grew even faster than the underlying R&D expense. This increased apportionment to foreign source income reduced our Section 904 limitation in amounts greater than our unused credits, i.e., if we had not increased our R&D expenditures we would not have run into a Section 904 limitation. The net result is the equivalent of denying a deduction for a portion of our increased R&D expenditure.

We believe Reg. 1.861-8 attempts to address problems that are more appropriately addressed under Sections 367 and 482 of the Internal Revenue Code, i.e., the transfer of technology abroad free of charge. Therefore, we see no particular reason to allocate and apportion domestic expenses to foreign source income (other than royalty income). As to the allocation to royalty income, we believe that such allocations should be simply on a gross income to gross income basis, taking into account gross income from foreign source royalties and all domestic gross income (including domestic manufacturing gross income) which arises as a result of the use of R&D knowhow. Such an approach would certainly eliminate the negative effects of Reg. 1.861-8 which undercut the explicit national effort to encourage expanded R&D. We believe that this matter could be addressed by regulation alone, and still be consistant with the existing law.

As a matter of congressional policy, however, we believe that the moratorium found in the Economic Recovery Tax Act should be made permanent as proposed in S.654. By making the moratorium permanent, it would encourage firms to relocate their R&D activities within the U.S., and would serve as a further encouragement to expand their U.S. R&D efforts. The Congress has already indicated its firm commitment to and belief in the fact that R&D will lead to industry growth and profitability, as well as improved export performance. High technology companies such as Foxboro have in the past spent significant funds on R&D. As a result, they have grown and prospered, and have provided increased employment in the U.S. Such firms, along with Foxboro, have also significantly expanded exports. We think it is important that the Congress send a signal to all high technology companies that increased R&D expenditures are to be encouraged, not penalized.

Thank you very much for considering the points raised in this letter. If we can be of further assistance, please do not hesitate to contact us.

Sincerely,

THE FOXBORO COMPANY

Paul Cherecwich, Jr.
Corporate Tax Manager

PCJr:sjc

cc: Senator Packwood
Senator Wallop

IBM CORPORATION STATEMENT FOR HEARINGS BY THE SENATE FINANCE SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT

May 27, 1983

The Finance Subcommittee on Taxation and Debt Management is to be commended for addressing the subject of R&D and technology education assistance as they are vital national issues. IBM has always recognized that the success of our company depends on vitality of our basic research; the competitiveness of our technology in markets both here and abroad; and the quality of mathematics, science and professional education which provide the important human resources of our business. The public and the Congress have long been interested in our educational system and the nation's scientific research, development and productivity. Lately the ability of U.S. companies to compete with Japanese and other foreign companies has become of prime importance. There is now widespread consensus that R&D and math, science and engineering education, the roots of our economic prosperity, have been neglected, and are critical to the job of rebuilding our economy. The computer as an information and productivity tool has increased the need for attention and action.

IBM supports S. 738, which would make permanent the tax credit for increasing research activity; S. 654, which would permit the deduction of all research and experimentation expenditures against U.S. source income for research conducted in the U.S.; and S. 1194 and S. 1195, which would promote contributions of scientific equipment to our schools and foster university research. All are important measures which are key to our nation's economic health and would make U.S. companies more competitive in the world markets.

The Importance of Worldwide Competition

Because of the importance of semiconductors and computers, worldwide competition in the two industries is increasing. The industrial and developing nations recognize the fundamental importance of viable domestic capabilities.

With Government initiatives, especially in Japan, France, Germany, and England, the knowledge base of these technologies is spreading worldwide and is augmented by the contributions in research, development, and manufacturing that these nations are making.

The United States no longer has an undisputed lead in these two industries. In fact, in specific sectors of these industries, such as memory devices, calculators, and displays, the USA has lost its preeminence.

In 1971, the United States suffered its first balance of trade deficit since 1897. Since then, deficits have been persistent and large. If we are to recapture a healthy trade position, it is essential that increased amounts are spent on R&D and that educated Americans are available in ever increasing numbers to retain this renewed leadership.

Role of Research and Higher Education

In order for the high technology sectors to progress and continue to advance, research and development efforts must be expanded, and qualified technical professionals must be made available to industry and academia.

On both of these counts, the United States is not keeping up with its world competitors. U.S. R&D spending as a percent of GNP has been dropping from a high of 3% in 1963 to 2.3% in 1981. In the same time frame that figure in Japan has increased from 1% to close to 2% and West Germany from 1.25% to 2.4%.

While in total dollars, U.S. R&D spending is the highest in the world, the gap narrows considerably if defense R&D spending is excluded. Also, government spending by Japan and European countries is heavily focused on target industries; the semiconductor and computer industries, in particular.

With regard to education, the U.S. has been overtaken by Japan in the yearly generation of electronic and electrical engineers. This discipline is a basic one for most high technology industry sectors, especially semiconductors, computers and the telecommunications industry.

For U.S. industry to remain competitive, it is important to address both the education and the research problem. Industry, together with the academic community, must take necessary steps to assure a continuous flow of professional skills and a continuous investment in research and development.

R&D Incentives (S. 738, S. 654)

From 1973 through 1981 IBM's increase in R&D averaged about 10% per year. In 1982 IBM's increase in R&D over 1981 was greater than 25%, an increase in the growth rate of 150%. We estimate that in 1983 our increase over 1982 will again be about 25%. Though we may not continue to increase R&D at this rate on into the future, IBM has, as is evident in other high technology companies, overcome a "communication lag" between our financial management and our R&D operations. Financial management has made it clear that there are incentives for increasing R&D and that we are now operating in a different environment and are prepared to make additional long term commitments. We need the certainty now that these incentives will be available in the future.

The incentive of Internal Revenue Code Section 44F, Credit for Increasing Research Activities, appropriately provides a stimulant for increasing R&D investments. It is an effective incentive and we urge that it be made permanent at the earliest possible time by Congress.

It is widely recognized that R&D involves high risk. Specific high risk efforts require nominal or seed money to begin with. The bulk of the R&D funds will be spent in the later half of the project's life. Typically for IBM only 10% to 15% of the total R&D occurs during the first 2 years of the R&D effort which normally last anywhere from 4 to 10 years. Because the current R&D credit will terminate in 2½ years, IBM would be more responsive to undertake additional R&D efforts if the credit were made permanent so that a majority of R&D expenditures would be creditable in 1986 and beyond.

The R&D tax credit is an effective tax policy measure to address concerns about the health of our nation's high technology industries and our new and middle size innovative companies. These high technology and innovative companies will be the keystone of efforts to maintain the U.S. in a leadership position in world trade, a position on which our future economic prosperity depends. The tax credit also acts to offset other recent tax measures enacted into our income tax system that have put a higher burden per dollar of income on companies like IBM. The prime example is the Accelerated Cost Recovery System (ACRS) impact on computer equipment. IBM's experience prior to 1981, showed that the true useful life of our computer equipment was five years or less. Under the law applicable in those years, users could write off this equipment under the 200% declining balance method (40% the first year, 24% the second year, 16.4% the third year, and 9.8% in the fourth and fifth years). In 1981, Congress enacted the ACRS which was designed greatly to speed up cost recovery. For many industries, the effect was dramatically favorable. However, in the case of assets which had established five-year lives or less, there was no shortening of recovery period and the rate of deductions was limited to 150% declining balance with a half year convention (*i.e.*, 15% in the first year, 22% in the second year, and 21% in each of the succeeding years). The 1981 Act contained provisions that would in effect restore the 200% declining balance method by 1986. However, with 1982 came a search for greater revenues, and this promised return to 200% declining balance was repealed (and 5% was knocked off the depreciation base in connection with the investment tax credit). The end result is that users of high technology equipment were distinctly worse off. With the expiration of the R&D tax credit, the result will be a disincentive for high technology industries.

The recent proposed Treasury Regulations (published January 21, 1983) on the R&D tax credit are severely discriminatory against IBM by denying generally development of computer software as qualifying expenditures. Congress did not intend by the passage of the tax incentive designed to encourage private research and development to have the perverse effect of restricting the category of qualifying expenditures. If the proposed Treasury Regulations were adopted in their present form, there can be no doubt that developers of computer software will be significantly worse off than they were before 1981. Ironically, the proposed Treasury Regulations not only restrict research in one of the most promising industries for increasing productivity and trade in the U.S. today, they single out for restriction what is probably the most important ingredient for research and development--computer software. Congress specifically addressed the status of the cost of developing computer software in the 1981 legislative history of Section 44F by including the statment that "expenditures which otherwise would qualify for the new credit are not to be disqualified solely because such costs are incurred in developing computer 'software', rather than in developing 'hardware'." We understand that Treasury has reconsidered this discriminatory position and will honor the intent of Congress. The Senate Finance Committee will have to stay vigilant to assure that the intent of Congress is carried out and the early enactment of S. 738 will be important to alleviate these disincentives for the computer industry R&D efforts.

For these reasons, the top priority for Congress in encouraging future R&D investment is to make the credit which expires December 31, 1985 permanent now.

The requirement of Internal Revenue Code Section 861 and the 1977 Treasury Department Regulations promulgated thereunder requiring allocation of R&D expenditures in the U.S. against foreign source income serves as both a disincentive for increasing foreign sales and as an incentive for placing R&D overseas at a time when U.S. interests call for exactly the opposite effect. The Congress should make permanent the correction of these problems by continuing the deduction of all U.S. research and experimental expenditures against U.S. source income.

Education Development Assistance (S. 1194, S. 1195)

The supply of human resources is necessary for IBM's growth and competitiveness. Our employees are of utmost importance to ensure the success of our company.

We are highly dependent on a vital, intellectually competitive university research and education community for both human resources and research. Unfortunately, it is precisely in our field of activity that the universities have the greatest difficulty responding due to lack of resources. As a result, there are critical professional skill shortages and a need to revitalize exploratory, non-propietary research in the universities and national laboratories in the basic disciplines of mathematic, physical and computer science and engineering.

The growth of our economy and in particular our industry is directly tied to the quality of the entire U.S. system of education and the labor force it produces.

Public Education (K-12) in the U.S. is, on the average, demonstrably non-competitive with that in Japan, Germany and the USSR in mathematics and the sciences. The revolution of the computer has caught our educators at secondary schools unprepared. We are now entering a catch-up period. The loss of gifted youngsters to science and engineering careers because they do not receive an adequate math, science and computer literacy education is one manifestation of the problem. But even more important is the current and future level of "technological literacy" in the workforce as a whole, when the tools of work increasingly call for mental skills.

Industry is woking to combat these deficiencies. For example, IBM has the following programs underway:

1. $50 million (over a three-year period) in CAD/CAM equipment and curriculum development grants in engineering schools to motivate and train engineers for careers in high productivity, through the use of automated manufacturing.

2. Over 400 cooperative research projects between university and IBM laboratories in close to 100 U.S. institutions totalling a multiyear commitment of about $60 million.

3. Funding 200 graduate fellowships, awarded by merit in key disciplines in university departments.

4. Faculty loans of over 60 IBM professionals to universities and secondary schools annually, including several minority colleges.

5. Joint funding with other companies of the Semiconductor Research Cooperative, which has a current budget of near $12 million to invest in university research programs; consideration of a similar consortium to initiate a national center for magnetics research at one or two major universities.

6. Grants of funds and contribution of Personal Computers totalling $4.25 million in a pilot program in three states to assist secondary schools and teachers to make effective use of computers in the classroom. Teachers and students in selected secondary schools will be learning about computers firsthand through an IBM-sponsored computer literacy education program. IBM will donate up to 1,500 Personal Computers and related software to teacher-training institutions and secondary schools in a program designed to help schools get maximum benefit from computers in their curricula.

7. Other grants to educational institutions for faculty development and curriculum improvement totalling about $2.1 million in 1982 and increasing sharply in the future.

While these activities are substantial, it is important to remember that total industrial support for academic R&D in the U.S. is less than 7% of the total. Similarly, total industrial philanthropy to higher education in the U.S. is less than 3% of university operating costs.

Thus, while industry support for research and human resources has very important direction-setting influence on academic institutions, it is not a substitute for substantial private and governmental support, on which universities must depend.

IBM supports in concept S. 1194 and S. 1195 which are significant efforts to address this critical need. They include additional incentives to industry to provide certain scientific and computing equipment to our schools and in other research activities. A beginning occurred in 1981 with enactment of Internal Revenue Code Subsection 170(e)(4) but there is a need to clarify remaining uncertainties of that legislation and expand the incentives as reflected in S. 1194 and S. 1195.

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June 3, 1983

The Honorable Bob Packwood
Chairman
Subcommittee on Taxation and Debt
  Management
Committee on Finance
United States Senate
SD-221 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Senator Packwood and
  Members of the Subcommittee:

"Miscellaneous Tax Bills": Public Hearings of May 27, 1983, Concerning Proposed Legislation on Tax Aspects of Research and Experimentation and Charitable Contributions (S. 738, 1194, and 1195) /1

Introduction

The Machinery and Allied Products Institute (MAPI) is pleased to have this opportunity to present its views to the Subcommittee on Taxation and Debt Management concerning three of four bills currently under consideration that would (1) extend certain federal income tax provisions pertaining to research and experimentation (R&E) beyond their statutory expiration dates; and (2) introduce liberalized tax treatment for certain charitable contributions. We refer to S. 738 of Senator Danforth and others to make permanent the credit for

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1/ We understand that the hearing on S. 654 of Senator Wallop and others, to require the deduction against U.S.-source income of all U.S.-conducted R&E under Section 862(b) has been postponed. MAPI expects to present views on S. 654 when the public hearing is rescheduled. As to S. 1147, we have no position at this time.

increasing research activity; and S. 1194 of Senator Danforth and S. 1195 of Senators Bentsen and Chafee to increase the charitable deduction for certain gifts of computers and scientific equipment, to expand the tax credit for research activities, and to extend the exclusion from income for certain amounts received by students.

Our statement is submitted pursuant to Senate Finance Committee Press Release No. 83-139 by which interested parties have been invited to express their thoughts concerning bills under review by the Subcommittee in the hearing of May 27, 1983. We ask that our statement be included in full text in the printed record of the hearing.

As the Subcommittee may know, MAPI is the national organization of producers of capital goods and allied products. In that capacity, the Institute represents industries manufacturing and marketing the facilities of production, distribution, transportation, communication, and commerce. More specifically, MAPI's membership includes corporations in a number of the most research-intensive industries in the United States, such as, machinery, including office, computing, and accounting machines; electrical equipment; professional and scientific instruments; motor vehicles and related equipment; aircraft and missiles; and, to some extent, chemicals and allied products./1 The Institute's member companies produce highly engineered--often state-of-the-art--goods that are sold worldwide, and technological advancement is

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1/ According to an April-June 1982 survey by the National Science Foundation (NSF), company-funded--i.e., excluding government-funded sums--R&D for these industries is expected to reach $40 billion in 1983, Science Resources Studies Highlights, NSF 82-324, September 9, 1982.

essential to their activities. Indeed, a continuing commitment to R&E is fundamental to their ability to open and enlarge markets, create meaningful employment, secure the defense, and achieve other useful purposes.

U.S. R&E Performance /1

As to the U.S. R&E performance generally, with particular reference to the company-funded effort, National Science Foundation (NSF) surveys indicate that companies--which account for some 70 percent of the total U.S. R&E--have continued to expand their programs in real terms since 1980. However, the average annual rate of growth is expected to be less than three percent between 1980 and 1983, a rate of growth that is less than one-half the average rate of real growth--6.3 percent--that occurred during 1975 and 1980. The slowdown is attributed in part to economic uncertainties, lower profits, and higher real interest rates. Total U.S. R&E as a percentage of gross national product (GNP) in 1981 was approximately 2.4 percent and compares fairly well with other industrialized countries, other than the U.S.S.R. However, civilian U.S. R&E registered approximately 1.6 percent of GNP whereas West Germany and Japan--to cite two other significant trading nations--were at 2.2 percent and 1.9 percent, respectively.

1/ NSF uses the traditional phrase "research and development" (R&D), as compared to R&E, to describe investigative activity directed toward the creation of new or improved products or processes. Because the definition of R&D for statistical data collection purposes is similar to that of R&E, as used in the tax law, we employ the latter phrase (i.e., R&E) for convenience.

In the matter of full-time-equivalent R&E scientists and engineers as a percentage of the labor force, the U.S. record compares well with other nations. However, testimony received by the Subcommittee based on recent surveys indicates that certain countries (e.g., the U.S.S.R. and Japan) are producing many more engineering graduates annually per million of population than this country. Meanwhile, there is a large and growing gap between the demand for and supply of engineers in this country, partly due to the surging private sector need for technically trained people and to faculty and facility shortages in U.S. colleges and universities. Also, as noted in the recent report of the National Commission on Excellence in Education, our school system suffers from curriculum, facility, and other deficiencies, especially in mathematics and the sciences.

Without reciting statistics at length, we believe it can be shown that the recent U.S. record in R&E and in scientific and engineering education leaves something to be desired. The sort of assistance embodied in the bills before the Subcommittee would involve relatively little revenue and a minimum of federal government intrusion. In our opinion, the benefits could be substantial in relation to the costs, and the bills under examination are well worth the Subcommittee's attention.

MAPI Position, in Brief

Our position, in brief, is that the Subcommittee should report S. 738 favorably without delay, and give similar consideration when time permits to S. 1194, S. 1195, or legislation of like character. In our opinion, the R&E credit is likely to have beneficial effects over the long run for those companies with steady increases in their R&E effort, and we support an indefinite extension as well as the consideration of ways to increase its versatility. Also, we generally favor liberalized tax provisions to ease, through charitable deductions, the burden of the private sector in its efforts to revitalize and equip educational institutions in mathematics and the sciences.

On a separate matter with regard to the R&E credit, we suggest that the Subcommittee clarify for the Internal Revenue Service (IRS) in some appropriate manner that it was congressional intent to have the "independent research and development" (IRAD) of government contractors qualify in full for the credit irrespective of advance agreements limiting overhead allocations and irrespective of types of contracts to which IRAD costs are allocated. The original legislative history of the R&E credit is hopelessly confused on this point, and seems to contradict the statute itself. Moreover, we believe that IRS now is implementing the statute in a way that is inconsistent with its plain wording and contrary to sound policy.

Background

The several bills under examination and their subject matter are summarized below.

R&E Tax Credit

Pursuant to Code Section 44F, a nonrefundable income tax credit is allowed for qualified R&E expenditures paid or incurred by a taxpayer in carrying on a trade or business of the taxpayer. The credit applies only to the extent that the taxpayer's qualified R&E for the taxable year exceeds the average amount of the taxpayer's yearly qualified R&E in a specified base period (generally, the preceding three taxable years). The rate of the credit is 25 percent of the incremental amount.

For purposes of the credit, the statute adopts the definition of "research and experimentation" used for purposes of the special deduction rules under Code Section 174, subject to certain exclusions. R&E eligible for the credit consists of (1) "in-house" expenditures by the taxpayer for research, wages and supplies used in research, plus certain amounts paid for research use of laboratory equipment, computers, or other personal property; (2) 65 percent of amounts paid by the taxpayer for contract research conducted on the taxpayer's behalf; and (3) if the taxpayer is a corporation, 65 percent of the taxpayer's expenditures (including grants or contributions) pursuant to a written research agreement for basic research to be performed by universities or certain scientific research organizations.

The credit is available for the taxable year whether or not the taxpayer has elected under Section 174 to expense or amortize the R&E, and the amount of any Section 174 deduction is not reduced by the amount of the credit. Expenditures for research conducted outside the United States do not enter into the credit computation. Also, the credit is not available for research in the social sciences or humanities and is not available for research to the extent funded by any person (or any governmental entity).

"Sunset" and S. 738.--The incremental R&E credit applies to qualified research expenditures paid or incurred after June 30, 1981 and before January 1, 1986. S. 738 would eliminate the termination date and establish the credit as a permanent feature of the Code.

IRAD.--As already noted, the law denies research credits to the extent that R&E is funded by any grant, contract, or otherwise. At some point in the legislative dialogue, there was a hurried consideration of how, if at all, to relate this to unfunded IRAD of government contractors subject to advance agreements limiting this form of indirect cost allocation. The outcome took the form of identical footnotes in Senate Report No. 97-144 and House Report No. 97-201 that are confused on their face and clearly should be disregarded in light of the statute, tax equity, and simple logic. Confronted with the "circular" reasoning of the footnotes, the staff of the Joint Committee on Taxation withdrew from them in its General Explanation of the Economic Recovery Tax Act, and simply expressed the view--neither "for" nor "against" credit qualification for IRAD--that Treasury and IRS should decide by regulation the extent to which such amounts should qualify.

IRS now has taken the position in proposed regulations published in the Federal Register of January 21, 1983, that the law disallows credits for amounts paid by the government to a taxpayer on cost-plus and incentive-type contracts pursuant to indirect cost allocation rules for IRAD and bid and proposal costs.

Charitable Contributions

Existing provisions.--Under Code Section 170(e), deductions for contributions of property which have a value in excess of the taxpayer's basis in the property must be reduced by the amount of gain which would be ordinary income if the property were sold at fair market value. Thus, in the case of inventory, the taxpayer's deduction is reduced by the full amount of the value in excess of basis, so that the deduction is limited to basis. Under Section 170(e)(3) and (4), there are limited exceptions for contributions of inventory to charitable organizations that use the property solely for the care of the ill, the needy, or infants, and for contributions of scientific property to institutions of higher education for use in R&E or research training, in the United States in physical or biological sciences. In these situations, taxpayers may deduct the fair market value of inventory, limited to the lesser of (1) basis plus one-half of the taxpayer's markup on the property, or (2) twice basis.

Broadening the deduction, etc.; S. 1194 and S. 1195.--S. 1194 and S. 1195 are similar to one another and would broaden the charitable contribution deduction provisions and the credit for increasing research activity in order to facilitate gifts to educational institutions and otherwise increase the flow of resources to such organizations for research and scientific educational purposes. The bills also contain provisions to exclude from the gross income of certain graduate science students amounts received as scholarships, fellowship grants, qualified student loan forgiveness, and the reimbursement of certain expenses incidental to scholarships or fellowship grants.

S. 1194 in particular.--In the case of S. 1194, one category of equipment donation would be for transfers of qualifying computer equipment to precollege schools or to museums, libraries, or correctional institutions that use the equipment for educational purposes. Another category of qualifying equipment donation applies to transfers of qualified scientific instruments to institutions of higher education. The amount of the deduction for qualifying transfers would depend on whether the property transferred is new inventory or used scientific equipment, but, in either event, generally would be more than is allowed under current law.

The R&E credit would be amended in several ways: (1) payments to universities for the performance of basic research would be eliminated from base period research expenses; (2) payments by taxpayers to fund faculty salaries in mathematics, engineering, computer science, or the physical or biological/biomedical sciences in higher education would qualify for the credit as contract research expenses (3) amounts paid to fund scholarships, grants, or loans to graduate students in the various disciplines just mentioned would qualify for the credit as contract research expenses; and (4) organizations to which payments will qualify as contract research expenses would be redefined.

As already mentioned, another feature of the bill would provide an exclusion from gross income with respect to certain scholarships, grants, or loan forgiveness.

S. 1195.--S. 1195 is a variation on the theme of S. 1194, and differs in a number of relatively minor respects.

The Research Credit
(S. 738)

We already have noted the significance of R&E to MAPI's member companies and to industry at large. Also, we have attempted, using NSF data and projections, to give a quick indication of U.S. performance in isolation and vis-a-vis selected other industrial countries in regard to R&E effort. Finally, we have briefly alluded to the findings of a recent National Commission concerning the deteriorating state of education in this country, particularly as it pertains to mathematics and the sciences.

Certain of the information and statistics do not bode well, either as measures of current economic vitality or leading indicators of future progress. In our opinion, the level of R&E expenditures is less than desirable, both overall and as to the civilian element. Moreover, the existence of a 1985 sunset provision is impairing the operation of the R&E credit and should be eliminated as proposed by S. 738. Consideration also should be given to broadening the credit's impact.

Reasons for R&E Credit

Congress attempted in the Economic Recovery Tax Act of 1981 to address the relative economic stagnation of the 1970s by introducing a modernized system of capital cost recovery for tax purposes and by introducing a tax incentive to help spur R&E activity. These two tax provisions complemented one another because it was recognized that the economic malaise afflicting the nation was partly a function of the aging capital base and partly a consequence of an inadequate commitment to R&E. By encouraging new investment and experimentation through tax changes, Congress hoped to restore growth and productivity gain and to promote U.S. competitiveness in world markets without direct government intervention. With less than two years having elapsed since enactment of ERTA and with such period having coincided with the trough of a cyclical downturn, we have some difficulty in assessing the R&E credit but nonetheless see signs that it is working.

Performance

First, our experience historically has been that capital spending and R&E effort tend to be cut back in periods of economic slowdown. In part, this occurs because producers find themselves with unused or underutilized existing capacity, and generally cannot justify additions when profits are low or nonexistent, orders are down, interest rates are elevated, and market prospects appear questionable. Whereas decisions at the margin are affected by the reduced costs attributable to favorable tax provisions, capital additions simply will not be made where the foreseeable returns to capital in relation to outlays are unacceptable, as often is the case in a recession. R&E programs are less susceptible to cyclical swings because of their inherently long-term nature. However, the absence of a foreseeable near-term payoff also makes such programs vulnerable to funding reductions where short-term pressures are severe.

Notwithstanding the depth and duration of the recent recession, corporate spending for R&E has been maintained admirably. According to NSF surveys in early 1982--which are borne out by our experience--R&E budgets are doing well compared to other company departments being cut back due to slack business conditions. Reasons given to NSF included the increased awareness by company management of the importance of technological improvements and the favorable tax treatment accorded R&E activities.

Need To Act Now

We think it important that the favorable tax treatment for R&E be continued, and would remind the Subcommittee that the R&E credit was one of the few ERTA provisions benefiting some firms, especially those in areas of rapidly changing technology where asset lives already approximated those of the Accelerated Cost Recovery System. In our opinion, the "sunset" provision of the credit should be removed immediately rather than in 1985 because long-range planning for R&E already is being conducted through the year of credit termination, and businesses need to know whether the tax credit will be applicable or not. In that connection, we would point out to the Subcommittee that companies now seem to face major revenue law changes annually, and the uncertainty and instability caused by constant revisions in the tax requirements is an impediment to their planning processes. Similarly, the prospect that a tax credit will terminate forces them to disregard the credit until they know otherwise.

IRAD

Although legislation before the Subcommittee does not deal with IRAD specifically, we feel that the Subcommittee should be aware that IRS proposes to disqualify from creditability the R&E of many contractors on the basis of a garbled legislative history rather than the construction that would flow naturally from the statute. In our opinion, although legislation does not appear to be necessary, the Subcommittee should take such steps as are needed to clarify that IRAD qualifies for the credit and is not to be considered "funded by any person (or any governmental entity)."

To explain, IRAD is that part of a taxpayer's R&E program that is not performed pursuant to a contract, grant, or similar agreement, as explained in Defense Acquisition Regulation 15-205.35(a) and Cost Accounting Standard 420.30(a)(6) for affected government contractors. IRAD is undertaken at the discretion of the taxpayer, and need not relate to any current business with any customer. IRAD is taxpayer-initiated and taxpayer-managed; can be started, stopped, or changed at the taxpayer's pleasure; and is in all respects the taxpayer's own obligation. The cost ordinarily is borne by customers through indirect charges to business transactions that may have no relationship to the IRAD effort.

The Department of Defense (DoD) negotiates advance agreements for IRAD indirect cost allocations with some contractors because Public Law 91-441 requires such agreements and prohibits the use of DoD appropriations for IRAD that is not militarily germane. However, government does not purchase the IRAD, and the contractor remains substantially at risk for it. The result of government's intervention is that a ceiling is placed on the allocation--a procedure that may, in fact, increase the risk to the contractor by imposing limitations on recovery that may not exist in dealings with other customers. The ceiling does not mean that actual IRAD costs incurred and allocated to contracts will be allowed by DoD and, perhaps more significantly, the government normally does not obtain any rights to the IRAD work product.

Although our basic contention is that IRAD should be qualified under the law, as enacted, we note further that the IRS proposal would treat similarly situated taxpayers differently where, for example, there are two identical contracts, one with the government and having a cost ceiling for IRAD, and one with a commercial customer and not having such a ceiling. Assuming that these are cost-plus or incentive-type contracts, the first contractor would be denied research credits but the second would have such credits undiminished. Similarly, the concept of "funding" as embracing indirect cost allocations seems erroneous because such a concept, if applicable to all businesses, would disqualify most research from credit eligibility. We doubt that Congress would have enacted a research credit under such circumstances.

In short, we believe that the IRAD proposal of IRS--which is not called for by the statute itself--is discriminatory and contrary to the public interest as it would apply to government contractors with certain kinds of agreements. For these reasons, we urge that all such costs qualify without reference to contract type or advance agreements limiting indirect cost allocations.

Scientific Education
(S. 1194 and S. 1195)

We support S. 1194 and S. 1195 in principle, but do not want consideration of such measures to delay S. 738, which can be acted on with dispatch. In working to improve the bills, we suggest that the Subcommittee review the definitions of eligible property contributions to be certain that they cover all types of equipment, the use of which by the donee would be consistent with the purposes of S. 1194 and S. 1195. Also, further attention should be given to the proposal to alter the base period for the R&E credit to determine, among other things, whether additional structural changes should be made beyond those stated in the bills.

MAPI appreciates having the opportunity to present its views on these matters, and hopes that the Subcommittee will find them to be useful.

Respectfully,

Charles Stewart

President

Statement by

Saul K. Fenster

President

New Jersey Institute of Technology

on

S 1194, Technology Education Assistance and Development Act of 1983

and

S 1195, High Technology Research and Educational Development Act of 1983

on behalf of the

American Association of State Colleges and Universities

and

American Association of Colleges for Teacher Education
American Council on Education
American Educational Research Association
Association of Affiliated College and University Offices
Association of Catholic Colleges and Universities
Association of Urban Universities
Council of Graduate Schools in the United States
National Association for Equal Opportunity in Higher Education
National Association for College and University Business Officers
National Association of Independent Colleges and Universities
National Association of State Universities and Land-Grant Colleges
National Society of Professional Engineers
State University of New York

before the

Subcommittee on Taxation and Debt Management

Committee on Finance

United States Senate

May 27, 1983

My name is Saul K. Fenster and I am President of New Jersey Institute of Technology in Newark, New Jersey, a position I have held for the last five years. Prior to assuming the Presidency of New Jersey Institute of Technology I was Chairman of the Department of Mechanical Engineering, Associate Dean of Engineering and Provost at Fairleigh Dickinson University. I received a BME from City University of New York, an MS from Columbia University, and a Ph.D. from the University of Michigan. I am a member of the American Association for the Advancement of Science, American Society for Mechanical Engineering and American Society for Engineering Education.

I am pleased to have the opportunity to appear before this Subcommittee today to testify on S. 1194 and S. 1195.

I represent the 355 member institutions of the American Association of State Colleges and Universities and am currently Vice Chairman of its Committee on Science and Technology. I am also speaking on behalf of many of the associations that participated in the drafting of Higher Education's Agenda in Mathematics, Science and Technology Education. A copy of this document is attached for your information.

This subcommittee, Senators Danforth and Bentsen, are to be congratulated for the legislative initiatives contained in S. 1194 and S. 1195. S. 1194 and S. 1195 are important elements in developing a solution to the crisis confronting our nation in science, mathematics, technology and engineering education. We regard these proposals as one aspect of the total effort needed to resolve the urgent problems faced by our nation's educational institutions.

Recently much attention has been focused on legislation that would provide direct Federal support to revitalize science, mathematics and technology education. Congress has viewed with alarm the decline of our scientific educational system and has responded with numerous legislative proposals. House passage of H.R. 1310, the Emergency Mathematics and Science Education and Jobs Act, and the approval by the Senate Labor and Human Resources Committee of S. 1285, Education for Economic Security, are to be viewed as an important first stop in a renewed Federal effort and investment in future scientific growth and vitality.

S. 1194 and S. 1195 complement the initiatives contained in H.R. 1310 and S. 1285. The current crisis that confronts American colleges and universities in adequately training the next generation of scientists, engineers and technicians will have profound implications for our nation's future economic strength and military security. The solution to our problems must include a broad array of Federal, state, local and private sector initiatives. The use of tax credits as outlined in S. 1194 and S. 1195 is an additional mechanism that the Federal government can use to bolster our lagging state of science literacy.

My statement will focus on 2 aspects of the proposed legislation: (1) the enhanced equipment donation deduction, and (2) the expansion of the R and D credit to include faculty salaries and loans to graduate students in the sciences. I wish to acknowledge and support the comments offered by James P. Olson, President of the University of Missouri, with regard to the non-incremental tax credit for university basic research.

Equipment Donation Deductions

W. Edward Lear, writing in the February 1983 Journal of Metals, noted that "During the past decade, the undergraduate laboratory equipment holdings of engineering colleges have steadily lost ground to rapid obsolesence and inflation. Today the job of restoring these laboratories to something near state of the art is one of enormous proportions."

The enormity of the situation was highlighted by a survey conducted last fall by the National Society of Professional Engineers. According to their survey the cost of modernizing engineering school laboratories to bring it up to 1971 standards, as well as accomodate the increasing undergraduate enrollments, approximates $2.2 billion; this sum is soley for instructional needs.

At my institution, New Jersey Institute of Technology, we need a minimum of two million dollars to meet short term equipment upgrading requirements. Our plan would be to spend $400,000 a year over five years. Unfortunately, owing to budgetary constraints only $200,000 a year is available and as a result we have not been able to replace the equipment that we need.

California Polytechnic State University at San Luis Obispo has also been unable to keep abreast of needs in laboratory equipment, maintenance and replacement. They lack technicians to maintain and repair equipment. Much of the equipment is so old it is difficult to obtain replacements parts. In some cases the University has asked for, and received, donations from industry.

Industry's obsolete equipment is then used in the laboratory instruction programs--though obsolete by industry standards this equipment is in most cases newer than the equipment already in the laboratories.

The list of examples of inadequate equipment at both public and independent institutions is indeed a lengthy one. Suffice it to say that the state of U.S. laboratories and the equipment our students encounter there threatens the quality of their education and ultimately our technical manpower base.

The staggering amounts necessary to remedy the equipment problem coupled with the budget crunch at the state and local levels demand a broad range of solutions rather that just one.

The use of tax deductions to promote equipment donations by corporations to colleges and universities was furthered by the passage of the Economic Recovery Tax Act of 1981. However, this legislation was narrow in scope and was limited to equipment used for research or research training in the physical and biological sciences. Dr. Olson, in his testimony, noted that this provision is beginning to have a positive impact on equipment donations to his univeristy. This is also substantiated by my experiences. At New Jersey Institute of Technology donations in FY 1980 amounted to $80,000; this year the amount is $360,000.

Further indications of the positive impact of this provision are contained in a just released report from the National Science Foundation. "An Early Assessment of Three R and D Tax Incentives Provided by the Economic Recovery Tax Act of 1981" by NSF's Division of Policy Research and Analysis, concludes that the ERTA-81 "did in fact provide an increased incentive compared to prior law."

However, ERTA-1981 was restrictive. Equipment used for educational or teaching purposes was not included in the credit and this is an area in which the needs are staggering. S. 1194 and S. 1195 broaden the deduction to include these purposes and extend its application to educational institutions at all levels. We strongly support this expansion. We also support provisions in S. 1194 and S. 1195 that

* provide comparable treatment for service contracts and for equipment needed to service technical equipment.

* provide computer manufacturers with an incentive to donate equipment at the procollegiate level

We are hopeful that the prediction offerred recently by William G. Moore, Jr., President and CEO, Recognition Equipment Inc., speaking for the American Electronics Association before this Subcommittee will come to fruition. "The tax enhancements of these bills relating to scientific equipment donations for instructional use will act as incentives for manufacturers to invest capital equipment in the education and training of the U.S. technical workforce."

Engineering faculty shortages

Data from the ASEE Engineering Research Council indicates that there has been a 111 percent growth in undergraduate engineering enrollments over the last decade; this is in contrast to the mere 11% increase in engineering faculty during that same time. Indeed current estimates are that there are 2,000 engineering faculty slots vacant in our nation's engineering schools.

This sharp divergence between rising undergraduate engineering enrollments and vacant engineering faculty positions has had severe impercations for the quality of education that our engineering schools are offering. For example, data from the Engineering College Faculty Shortage Project indicates that teaching loads have increased dramatically; faculty research has been reduced; faculty has placed a greater reliance on graduate teaching assistants or part time faculty; and catologed courses in certain subjects have been cancelled.

The critical situation relating to faculty shortages, recruitment and retention is a result of the fact that few students want to continue on for the doctoral engineering degrees required to teach. Senator Bentsen, in introducing S. 1195, noted that "engineering colleges and universities cannot successfully compete for graduate engineers with private industry. They are last in the salary sweepstakes and are failing further behind each academic year." At present, B.S. graduates from engineering schools are getting annual salaries upon graduation (between $23,000 and $29,000) which exceed academic salaries of new faculty faculty with doctorate degrees (usually between $19,000 and $26,000).

Despite the economic slowdown there is still brisk demand by industry for the over 1100 New Jersey Institute of Technology graduates this year. Qualified students are thus discouraged from pursuing graduate studies which eventually would lead to a faculty position. When faculty retires we face difficulties in replacing them. Each year some are attracted by the higher salaries offered by industry. Thus, we were able to fill only about one-half of the available faculty openings.

S. 1194 and S. 1195 address the faculty shortage problem positively. We are hopeful that extending the R and D tax credit to encourage private industry to augment faculty salaries will provide signigicant immediate assistance in dealing with faculty vacancies.

Further, we support the provisions of S. 1194 and S. 1195 that enhance the impact of grants, scholarships and loans made to graduate students in math, engineering, physical and biological sciences. The effect of this should be to increase the number of students that go on for their doctorates and ultimately teach.

I would like to take this opportunity to commend Senators Danforth and Bentsen and the other co-sponsors for introducing S. 1194 and S. 1195 and for holding hearings on these bills. S. 1194 and S. 1195 will encourage a partnership between the Federal government and private industry to solve some of the critical problems of scientific education in our colleges and universities. These legislative initiatives are important examples of the use of tax mechanisms to further important national policy goals: the improvement of our scientific education base.

RICE UNIVERSITY
HOUSTON, TEXAS 77001

NORMAN HACKERMAN
PRESIDENT

May 31, 1983

The Honorable Robert Dole
Chairman, Senate Finance Committee
The United States Senate
Dirksen Office Building
Washington, D.C. 20510

Dear Senator Dole:

I appreciate this opportunity to testify in behalf of Senate Bill 1195. As Senator Bentsen suggested in his remarks in introducing this Bill (May 3, 1983) the purpose of Federal support of science is in anticipation of its ultimate use by this country. Thus, the support of science without assuring the availability of scientists and engineers to translate science to technology to use becomes almost pointless.

In order to provide a steady stream of educated scientists and engineers the country requires a strong system of education facing forward and outward rather backward and inward. This means working with faculty and facilities at the cutting edge.

The system for higher education in our country involves providing broad accessibility to all fields for all students at the atart with subsequent focusing, and at the graduate level more intense narrowing. Thus, we teach our future scientists and engineers along with all others in the early stages and more nearly by themselves later on.

It is important that these people be exposed to good minds and proper facilities throughout. It is equally important that all students be exposed to good minds throughout.

A large part of Federal support provides for the later stages of student development via research grants. Facilities at the earlier stages suffer seriously, particularly in engineering. Also there may well be an especially acute problem with computer equipment since the field is moving so rapidly.

This Bill would provide one suitable way to alleviate the problem. I applaud especially the recognition of the importance of maintenance and repair (see Sections IA(2), B(3), and C(4) of the summary in Senator Bentsen's introductory statement. This aspect of useful and useable laboratory equipment is generally neglected in most approaches to this problem.

There is currently faculty shortage in some areas of science and engineering education. The shortfall is most notable in computer-related areas. Thus, any reasonable approach to helping reduce this constraint is worthwhile here, however, a caveat is required.

In IIA of the summary reference is made to "...to fund faculty salaries...". This must be examined carefully because a one time increase in a faculty members salary becomes a long term commitment of the university. Thus, when the external source of the increment is no longer available the fiscal responsibility remains with the university. Some of our current financial problems stem from this cause in the past. Perhaps a system of fixed comments or non-salary supplements should be used.

In summary, the purpose of SB1195 to provide for more direct support of the education of scientists and engineers by industry is good. The procedures set up by the Bill, with the exception noted, are likely to be effective.

Sincerely,

NH:jb

cc: The Honorable Lloyd Bentsen

Tandy Corporation/Radio Shack
Executive Offices 1900 One Tandy Center Post Office Box 17180 Fort Worth, Texas 76102 Telephone (817)390-3700

John V. Roach
President
Chief Executive Officer
Chairman of the Board
390-3214

1983 MAY 27 PM 5

May 26, 1983

The Honorable Bob Packwood
United States Senate, SR 259
Washington, D.C. 20510

Re: Hearings on S. 1194 and S. 1195

Dear Senator Packwood:

Since I am unable to be present for the hearings on S. 1194 and S. 1195 scheduled for Friday, May 27th, I would appreciate your making these views a part of the hearing record. My comments are addressed specifically to the provisions of the two bills which deal with increased tax deductions for contributions of computer equipment and related software to elementary and secondary schools, and to the provisions dealing with teacher training.

First, I would like to compliment the Committee and the sponsors of S. 1194 (Senator Danforth) and S. 1195 (Senators Bentsen and Chafee) for addressing the very serious national need to provide our young people with the skills and knowledge they must have to function in a world increasingly dependent on the use of computers. This need has long been a major concern of Tandy Corporation which we have addressed by making gifts, loans and providing discount purchases of more than 100,000 computers to schools, and by providing free training in the use of computers to more than 125,000 educators and administrators during the past twelve months alone. On March 23, 1983, we announced a new program -- America's Educational Challenge™ -- to provide every elementary and secondary school teacher in America with an opportunity to achieve a basic understanding of computers and their applications in education at no cost to themselves, their schools, or taxpayers. Since we estimate that there will be over 500,000 microcomputers in the nation's schools by the end of the 1983 school year, the magnitude of this undertaking is obvious.

In our view, any computer contribution bill providing for an increased tax deduction should require that the following three conditions be satisfied: First, a complete working computer must be donated. It does little good to encourage the contribution of unusable equipment. Second, software suitable for use in the educational environment must be a part of the contribution. Contributions of a computer alone -- unaccompanied by at least some suitable software -- do little to achieve the objective of educating students. Third -- and most important -- there must be adequate teacher training. To permit increased deductions without requiring adequate teacher training amounts to little more than a subsidy to computer manufacturers; it certainly does little to promote the education of children in the use of computers. The fact is that there are many computers now in our classrooms that are gathering dust because of the lack of trained teachers (see the attached articles). Tandy knows from experience that the education of teachers in the use of computers is the critical link in achieving the goal of computer literacy for our young people.

Last year the House enacted the Apple Bill (H.R. 5573) which only addressed the equipment contribution part of the problem. The bill encouraged computer manufacturers to donate computers to elementary and secondary schools by providing for a tax deduction of 200% of the cost of the computer. As written, the Apple Bill had four serious flaws.

First, the Apple Bill did not require the contribution of a complete, working computer.

Second, the Apple Bill did not require training of the teachers who would be using the computers as teaching tools. A number of education groups criticized this deficiency.

Third, the Apple Bill did not require the contribution of software suitable for use in the educational environment; the deduction could have been obtained by a contribution of hardware alone, and incomplete hardware at that.

Fourth, the tax deduction of 200% was very expensive and in our view was far in excess of what might be needed to stimulate additional contributions of equipment. The Washington Post estimated that last year's Senate version of the Bill would have cost over $300 million. But whatever the precise cost, there is no doubt that a 200% tax deduction would have amounted to little more than a massive subsidy of one of America's most profitable industries at a time when the nation faces huge budget deficits.

House Majority Leader Jim Wright has recently introduced a bill (H.R. 2417) that corrects the Apple Bill's deficiencies. The Wright Bill permits companies which donate computers to elementary and secondary schools to take a deduction of 125% of cost (rather than 200%), but only if suitable educational software and adequate teacher training are also provided at no additional cost to the taxpayer. The Wright Bill represents an approach that Tandy strongly supports. We commend it to you as a useful model for the Committee to consider during its deliberations on S. 1194 and S. 1195.

Of the two bills (S. 1194 and S. 1195), the Bentsen-Chafee Bill (S. 1195) comes closest to meeting the essential objectives we have described above. However, both bills provide for a maximum deduction of 200% of basis cost, which is, we believe, far in excess of what is needed to stimulate manufacturer participation in the program. Moreover, S. 1194 would permit separate 200% deductions for contributions of hardware, software, and teacher training, while at the same time not requiring teacher training and suitable software to obtain the 200% deduction. This approach is in our view unduly expensive and might not achieve the desired goal of providing computer education for our young people.

In this time of growing educational need and limited budgetary resources, it is important to enact comprehensive legislation which meets the educational challenge at the lowest possible cost to the taxpayer. Therefore, I strongly urge the Committee to make mandatory the provision of adequate teacher training and suitable educational software as a condition of obtaining any increased deduction, and that a deduction substantially lower than 200% be enacted.

As the Committee's consideration of this legislation proceeds, we would be pleased to work with you and the Committee staff to ensure that the goals of S. 1194 and S. 1195 are met fully and responsibly.

Very truly yours

John V. Roach

John V. Roach

[From the New York Times, Apr. 24, 1983]

PLUGGING TEACHERS INTO COMPUTER ERA

(By Sally Reed)

CHICAGO.—At Taft High School on the Northwest Side last month, before television crews and a slew of reporters and photographers, Chicago's large, financially drained school system began tackling what may be the most critical issue in education today. Sitting in front of 100 donated machines, the first of all of the city's 22,000 elementary and secondary public-school teachers and 500 of its administrators began attending one-day, six-hour workshops to introduce them to the microcomputer in the classroom. Chicago's effort, while bigger than most—it is billed as the nation's largest teacher-training project—is hardly the only one. This spring, in colleges, converted lunchrooms, in front of closed-circuit television screens, at conferences and in almost all parts of the country, teachers are learning to use computers.

The need has become critical because of the dramatic impact of technology on schools in recent years. According to the National center for education Statistics, the number of microcomputers in schools tripled between the fall of 1980 and the spring of 1982. Three-fifths of all secondary schools and one-fifth of elementary schools now have at least one microcomputer.

"Many schools now have the hardware, but they don't know what to do with it," said Gwendolyn C. Baker, vice president and dean of graduate children's programs at the Bank Street College of Education in New York. "The great need right now is for teachers to become computer-literate."

The issue, however, is extremely complex; it involves problems with school financing, the quality of instruction, the shortage of teachers in certain subject areas and debates about what it is that teachers should know.

Teachers need the training to teach computer literacy or basic computer concepts, computer science at the secondary level and basic skills at the elementary level. Yet the National Education Association says that according to a recent survey 82 percent of teachers want to take instructionally geared computer courses but only 20 percent have received training thus far. "There's a significant problem with the availability of computers as well as adequate training of teachers on how to use them," said Willard McGuire, N.E.A. president.

Some school systems—in such places as Decatur, Ga., Lyons Township, Ill., Hopkins, Minn., Scarsdale, N.Y., and Houston—have become models for training their teachers for computer use, starting several years ago. Last year the New York City Board of Education organized 10-week computer courses for teachers throughout the city. By the end of this school year 6,000 teachers will have completed the program. In Wilmette, Ill., all the public-school teachers have had a basic computer literacy course and the school district is subsidizing further instruction for interested teachers in a nearby college.

"But teacher training, unforunately, has been a very ad hoc kind of thing so far," said Lawrence Lipsitz, editor of Educational Technology. "It's more of an administrative problem now. Teachers in general are leading the administrators where there is a lack of leadership. Administrators don't have the expertise. So it's not just a problem of teacher training. Most school systems have not had the expertise to run training programs."

Teachers are getting the training from a variety of sources. Often one teacher in the school is trained and then trains others. In Connecticut, a recent survey of school districts revealed that the teacher training may come from several different sources in any given district: in-service teacher classes at a local school, courses at a local college, cooperating school district workshops and vendors of the machines.

"The teachers, interestingly, have been very remarkable," said Mr. Lipsitz. "I don't see any teachers anymore who are opposed to the computer. Now, some confess misgivings and feel they are not equipped. But I don't meet any teachers who say we shouldn't have computers in the schools today. That has been a remarkable change. That's all happened within three years and in a field where it supposedly takes 50 years to change anybody's idea about anything."

According to Robert Taylor, associate professor of education at Columbia University's Teachers College, the most serious opposition to teacher training on computers comes for those who first trained the teachers. "No matter what state you go to," Mr. Taylor said, "If a school district wants help it often can't get it from the local university or eduction faculty."

There are exceptions: The National College of Education in Evanston, Ill., now offers "Micro Computers I and II" for teachers. Stanford University has a new master of arts degree in "interactive education teachnology" that combines courses in computer science, educational psychology and curriculum theory and design.

Columbia's Teachers College has had computer courses since 1975. The University of Akron has a new Center for Computer-Based Education. At DePaul University next fall there will be a new master's degree program for teachers who want to refocus their skills in math and computer technology. And the Bank Street College of Education is attempting to train all of its faculty on the use of the computer.

"The interest on the part of teachers is there, but it's a financial dilemma for most school systems," said Sharon Woodruff, director of training services for Technical Education Research Centers in Cambridge, Mass. "It's not a lack of interest or concern but a means of support."

Where will that support come from? Industry has already made major contributions to schools. In addition to donating hardware, many businesses have also offered teacher training. The Tandy Corporation, for example, which markets its products through its Radio Shack outlets, is mailing instruction handbooks and basic computer-Literacy packages to 103,455 schools in the United States and offering free to teachers a limited number of classes in programming in Radio Shack equipment I.B.M. last month announced teacher-training programs where it has large facilities—New York, Florida and California.

Most educators hope the Federal Government will help underwrite teacher-training efforts. More than 20 bills are now before Congress to provide Federal grants, scholarships and tax credits. The American Federation of Teachers, representing 580,000 public-school teachers, however, recently issue a report seeking more Federal money than has been proposed. It wants the money to go to train teachers, provide scholarships to new math and science teachers and computer experts, increase the focus on training in the elementary schools and provide greater access to computers in poorer school districts.

In the absence of Federal support, many states have begun their own programs. In California, 19 regional technical centers have been established. Minnesota, the nation's leader in promoting computer literacy in the schools, established the Minnesota Educational Computer Consortium, which provides resources to each school district in the state. There is also a bill before the State Legislature requiring computer literacy of every teacher.

In New Jersey, the state's Boards of Education and of Higher Education will sponsor a conference this month for faculty members and administrators of the state's colleges and universities with education departments. The New York State Department of Education recently established its Center for Learning Technologies, which is organizing regional technical assistance centers for schools.

"But the scope of the issue is very large," Mr. Taylor of Teachers College said. "During the curriculum movement of the 1960's, when the Federal Government put big sums of money into training for special subject areas like physics or biology, it was for a much smaller segment of the teaching population. We're now talking about every teacher in the United States needing some computer training. The scope of that is enormous by any stretch of the imagination."

[From the Wall Street Journal, Apr. 12, 1983]

LEARNING HOW TO USE COMPUTERS IS FRIGHTENING EXPERIENCE FOR MANY

(By Virginia Inman)

Not long ago, when accountants needed computer services, they told data-processing people what they wanted and then waited for the results to come back on green and white printouts. People who were in business or at school hardly ever used computers themselves, though schools and businesses often used them for record keeping.

Now all that has changed, and millions of nontechnicians must use computers to do their jobs. But learning how to do it has been frightening for many of these people.

Dataquest Inc., a high-technology market-research company, says there were about three million computer terminals tied to central computer systems in the U.S. in 1980, not including personal computers or word processors. It expects the number to jump to 11.5 million by 1985.

Novices who use these machines are often afraid of breaking them. Nonspecialists are also intimidated by computer jargon and by error messages. And they're afraid of looking dumb. Experts say computer anxiety can slow people down. It can also reduce self-esteem and productivity and hurt morale.

"ALL THESE BUTTONS

Cynthia Appleby, an administrative assistance at Fairchild Industries Inc. in Germantown, Md., panicked when she had to face a computerized teleconferencing system. "I was praying that my boss would come and get me for something," she says. In particular, she found trying to remember which buttons to hit while simultaneously talking to another office across the country very difficult. "You look at this control panel, with all these buttons," she says. "You think, if you press the wrong button and you totally blow the machine up, how much money it's going to cost the company."

Such fears are common. People unfamiliar with computers are "afraid that if they touch the wrong button, they'll blow up Pittsburgh," says Carol Blomstrom, chairman of the computer-studies department at National University, a San Diego school that specializes in programs for adults.

One reason people fear computers is that they can't see the effects of their actions. "You have to trust," says Thomas Sheridan, an engineering and applied psychology professor at the Massachusetts Institute of Technology. "Sometimes that trust is a coerced trust. Whenever you have a kind of forced blindness, certain problems arise. You've got superstition. You've got unhappiness." Widespread use of computer jargon by people who understand computers increases the fear among nonspecialists, he says.

RELAXING WITH GAMES

Donna Sarvis, a publishing employee and former National University student, thinks the mystique surrounding computers intimidates people. Many company computer rooms are little secret rooms "where these highly educated people are, and the rest of us are supposed to walk by in silence and say wow." To get novices over their fears, she says, computer specialists ought to "put some fun in it and quit making it this ominous thing that's going to take over our lives." A Sun Co. executive who took a training class says he was reluctant to hit the keyboard for fear of damaging the computer, but playing computer games with others in his class helped him relax.

Ann Jones, a 40-year-old first-grade teacher in Merrimac, Mass., is taking a "computer literacy" course at Lesley College in nearby Cambridge as part of a masters degree program in education. After about two months in the course, she's still afraid she'll damage the machine or erase someone else's programs.

She also becomes frustrated and scared when communication breaks down between her and the machine, especially since the reference manual is often unclear. She once spent an hour and a half trying to get a program to run. Finally, she tried a different machine, and the program ran. "I couldn't believe it. All that time lost" because of a mechanical failure, she recalls. "I might have checked sooner if I had known about the machines."

NASTY MESSAGES

Some computers seem to be designed to make people feel stupid or afraid. Janet Leonberger, a librarian who also attends Lesley, says "nasty messages," like "statement error" and "input error," frustrate her. The computer, she says, "won't tell you how to correct your mistakes or what the messages mean."

Ben Shneiderman, a University of Maryland computer-science professor, thinks computer-systems designers ought to get rid of vague or threatening messages. Seeing a message like "fatal error, run aborted" can be a jolting experience for a novice, says Prof. Shneiderman. Another common computer message, "syntax error," is so vague it's unhelpful. He suggests a more specific message, like "Unmatched left parenthesis," which would guide the user to correct the mistake.

Miss Jones, the first-grade teacher, says she learned how a car works in a high-school driver education course and wishes she has similar knowledge of computers. "If I could lift up the hood of a computer and know what I was looking at, it wouldn't seem so abstract," she says.

YOUNG PEOPLE ADJUST EASIER

In the work place, though, there isn't much time to teach people how computers operate or how to program them. When Murray Benett trains managers at a Fairchild division, he emphasizes how the computers can help them do their jobs. "To get managers to try to learn to program—that's harder," he says.

Of course, most users don't need to know how to program. They just need the right software package. But when they don't understand how a computer works, they don't know why they do certain things and the steps needed to operate the machine seem almost magical. Rebecca B. Corwin, a math professor at Lesley College who has studied teachers' reactions to computer training, has noticed that people get nervous about the order in which they're supposed to do things.

Computer anxiety affects all kinds of people, but some groups are more susceptible. Experts say people in their mid 30s and younger tend to adapt quickly, while those who are more than about 50 are more likely to be fearful. Prof. Sheridan compares using computers with assimilating into a new culture. "Kids pick it up first," he says, and older people don't want to look stupid. Young people also usually have more time than their elders to become familiar with the machines.

WOMEN LEARN QUICKLY

Carl Madding teaches Scott Paper Co. employees to use a computerized order processing system. He says older people in this classes "tend to be very reticent, very quiet. They tend to want to write everything down like it was something they were going to hold and cherish." But Prof. Corwin says that despite their greater initial fears, older people who want to use computers make excellent students. They're determined, she says, and they work hard.

According to Mr. Madding, the fastest learners are women in their 20s, possibly because they don't mind typing. Prof. Blomstrom also notices that women generally conquer computer anxiety faster than men. She thinks women, especially those who have been forced to reenter the work place, are more accustomed to change than men and more willing to admit their fears. It also helps, says Prof. Blomstrom, that "women don't have this phony status thing that they can't touch the keyboard."

William L. Howard, corporate director for performance and productivity at Fairchild, says that "middle managers are the toughest problem. They're less willing to change. They got where they are because they were expert at how their function operated, and now you're changing how the function operates."

Secretaries also resist computers. They're afraid they'll be tied to their desks as broadly defined jobs become typing positions.

After working with senior executives, Mr. Howard has decided age is less important than he once thought. "The quickest learners were the most senior executives," he says.

Prof. Corwin says teachers, managers and others in positions of authority often feel they ought to already know about computers and are afraid people will lose respect for them if they aren't immediately compentent. Many suffer from what La Jolla, Calif., psychologist Thomas McDonald calls "jerkophobia," or the fear of looking stupid. He says this particular anxiety is "quite common" among executives, who are used to being in command of situations. Says Mr. McDonald, "They're confronted with a machine that 13 year olds are whizzes on, and they don't know what to do."

[From the Miami News, May 10, 1983]

COMPUTER CONFUSION IN THE DADE CLASSROOM: STUDENTS FLOCK TO USE THEM; TEACHERS LACK IN KNOWLEDGE

(By Ellis Berger)

Few Dade County public school teachers have the foggiest idea of what to do with them.

Instructors say the students often know more than they do about their use.

They're microcomputers, the latest classroom acessory, a modern blend of gadgetry and technology, part toy, part tool, an electronic equivalent of notebook, textbook and tutor rolled into one.

Two years ago, Dade School Board bought more than $1 million worth of microcomputers. Next month the board will spend another $5.5 million on the school system's fledgling computer education program.

Yet many of the computers sit idle much of the time, largely unused by the students they were supposed to help.

Critics say the problem is the school system's lack of a clearly defined, countywide policy for computer education. Teachers and principals have been left on their own to grapple awkwardly with an alien technology, critics say. The school board only last week directed the administrative staff to draft such a policy.

Teachers say they lack adequate computer training. They complain that often they don't know who to turn to for repairs when a computer breaks down or is missing essential programs. And they feel frustrated by what appears to be a hit-or-miss approach.

Consider these examples:

Student interest in computers ran so high at Glades Junior High that pupils had to draw straws for 30 seats in its introductory computer class for ninth-graders. About 200 students were turned away because the school only had five working computers. Yet four more computers have sat unused for a month because they arrived without video screens.

The librarian at Vineland Elementary proudly told a reporter that the school's single computer get almost constant use—then conceded it had been out of order for the past several weeks while she tried "to find out who the school board contracts with" for repair work.

Seventeen computers at Treasure Island Elementary, purchased mostly through community donations, have been used for little more than game-playing because most of the "software"—the instructions that make a computer work—hasn't arrived for months after it was ordered.

Shenandoah Elementary principal Judy Richardson said she bought nine computers last summer with money that usually would have paid for paper supplies and other items. But so far, the computers have been mostly tied up in training teachers, not students.

Coral Reef Elementary's only computer is used by fewer than 40 of the school's 760 students. Only teachers Valerie Swanson knows how to use it, so it was placed in her classroom, where only her students have access to it. "Instead of putting it in the library, as in most schools, where they're not being used, the principal put it in my class," explained Swanson. "Now, at least 39 or 40 kids are getting to use it."

Ethel Teisch, the media specialist in charge of computer education at Shenandoah Elementary, faults the school board and school administrators for not developing an orderly, organized program and seeing that teachers were adequately trained.

"It's like giving birth to the baby without having given a thought to buying diapers or a crib," Teisch said.

School board chairman Holmes Braddock concedes that point.

"Obviously, it makes no sense to have teachers and principals operating without knowing what they're doing," Braddock said. "We need a policy that addresses questions of money and training. We need to know what to spend the money on and who gets trained.

"The problem is no one knows what 'computer literacy' means. We need a policy, but developing one is not so easy. It's like describing what a ghost looks like."

Just how many microcomputers are in Dade public schools today is anybody's guess, school officials say.

Besides the purchases by the system's central office, individual schools continue to buy more computers on their own, through fundraisers and donations from Parent Teacher Associations and by principals diverting money at their disposal for other uses such as supplies and equipment. An accurate inventory of all the equipment spread through the school system is not available, officials say.

The first time around, officials say, the bulk purchase price was too good to pass up until teachers could be trained and a countywide policy developed.

Nearly two years later, however, the computers the school board rushed to buy for $680 each are selling for under $600. And principals and teachers around the county are still trying to figure out on their own how to use them most effectively.

"The problem was, and still is," said Shenandoah's Teisch, "they're here and teachers do not know how to use them. The children know more than we do. To them, they're just an extension of the TV. But next year, we'll really have a program going."

Shenandoah expects to receive at least seven more computers next year—part of that $5.5 million purchase that will put more computers into schools with large numbers of children from low-income families. Teisch's biggest concern, however, is that not enough money will be spent on training.

"For every dollar spent buying computers," she insisted, "a dollar has to be spent training the personnel to use them. This year we had nine computers dropped into our laps, and it was only through our own persistence that our teachers are getting the training."

Teisch expresses another frequently heard concern: "We asked the vendor to show us how to use them, and they sent a real nice guy who simply had no way of explaining it to us. This is happening all over the county. He wasn't a teacher. He knew what he was talking about. His hands were moving all over the place. But when we ask for help, we need somebody capable of teaching."

Almost everywhere in the county, the sheer numbers of students overwhelm the sparse equipment available in most schools—most elementaries have only one instructional computer for the entire student body.

But extra computers would cause another problem: who would help the youngsters use them? Most schools have had to cope without additional aides or teachers to relieve class size and help prepare lessons plans.

Blue Lakes Elementary librarian Ann Gillott says few of her school's teachers are able to take advantage of the one computer now in the library, since only a few children can use it at a time. Most of the time now spent on the computer is by children whose classrooms are connected by sliding doors to the library and media center.

"What do you do with 25 kids when you take five to the library?" she asked. "But the kids are dying to use it. They'll come in and ask, 'When is my class coming in?' "

Gillott believes the school could use several more computers, including at least one on wheels that could be moved from classroom to classroom.

Another partial solution, Gillott suggests, is to encourage more parents to volunteer to work in the schools, especially with the new computer equipment.

"If I could teach the volunteer parents to load the computer, they could supervise the children and assist them" she said.

Something like that is happening—with mixed results—at Coral Way Elementary, where volunteer Luis Sanchez Fuentes assists small groups of children as they play educational games on the school's single computer, housed in the library.

Sanchez, who is also a paid worker in Coral Way's after-school program, spends several hours each day coaching children in the most basic use of the computer—playing games designed to hold their attention while helping them improve their skills in math and spelling.

But even that limited activity stops on those days when Sanchez can't come in, and the computer sits idle, as it did for several days recently when he was ill. The dozen teachers at the school who took an introductory course in use of computers can't spare the time away from their classroom to work with the equipment, nor does the school yet have an organized plan for its use, said principal Magali Acosta.

"This is more or less new to us," she said of the computer that has now been in the school for 15 months.

"We want to try it slowly but surely," she added. "We don't have official lists of children who use it. We're just getting the kids' feet wet.. We want to buy more computers, and have trained teachers use them and incorporate them into the regular classes.

Glades Junior High math teacher Paul Padgett says he's concerned the county has no adequate plan for students to continue using their newly-learned skills, while their interest is high

"I've designed a course to give hands-on experience to as many kids as possible," said Padgett, who has been working with computers for nearly 10 years, and is the only instructor at his school using omputers. A few others are taking courses on their own.

But after his students graduate to Southwest or Killian High, they may not touch a computer again in the classroom until two years later, when they get into the 12th grade, Padgett said.

Conversely, those students coming into the 7th grade at Glades with some elementary school experience with computers probably won't use them again in school unless the 9th grade, until they're able to get into Padgett's after-school club.

"I personally believe there should have been more time to train teachers, buy more equipment and set up a countywide program," Padgett said. "We all jumped in feet first. The county dumped this on the schools and said, 'Do what you want.' "

This year, Padgett is teaching two computer classes a day 15 students a class, three students to each of the five working computers. Over two semesters, 60 students will have gone through the course. Next year, the school should have 11 computers in use, and principal Thomas Zelenak plans to have Padget teaching five computer classes a day. That means 330 students—five times as many as this year—will get some computer education.

And what of Padgett's concern about so many students—from just this one junior high—entering the 10th grade eagerly looking for more computer courses?

"He's at least partially correct." said Killian principal Anthony Pariso. "I expect we'll have to do what we do with any course with a high demand. We'll give priority to the seniors and then the juniors, and any room left over will go to the sophomores."

Very few 10th graders, Pariso says, will get to use Killian's 15 computers. The school, he said, could use three times as many.

"The awkward part is there's a lot of interest," he said. "All of us in education know it's coming. But it's extremely expensive. To deal with that many kids, you almost need a lab situation, and a computer lab could cost $50,000. It's not like some other course, where it's just a matter of a $20 textbook. I would add two or three more computer labs immediately if I could."

The demand next year should be even greater, Pariso added.

"Most of the kids in high school today have grown up with hand calculators and video games," he said. "A lot of them have computers at home. They're astute enough to know it's the thing of the future. I've got a 7- and 10-year-old, and they want one."

The school system's computer supervisor also knows personally about the frustration of youngsters chafing for the chance to get their hands on a computer.

"I have two children at Glades, in the seventh and ninth grade, and they were unable to take the course," said Gary Forrester, appointed last month to head the school system's computer education efforts.

"I'm sad about it," Forrester said, "But I understand that the schools are desperately trying to be fair."

Criticism of Dade's efforts to date echo concerns expressed around the country, Forrester said, as school systems everywhere are feeling their way into a new era.

A case in point is the announcement last month that Hialeah-Miami Lakes High placed first among 350 schools across the country in data processing competition, based on composite scores of five tests administered since October.

It probably says something about Dade's program that only one of the country's 25 high schools entered the competition, Forrester admits. But he says he also had to wonder why no more than 350 schools in the entire country participated.

"Of our 25 senior highs, four or five could have participated and come up with commendable scores," he said. "And we certainly hope to increase that next year to 50 per cent or more of our high schools."

Forrester said he knew of no Dade elementary school offhand that could compete in national competition, "but some individual students could enter."

If Dade isn't unique, the problems with computers are, he says.

"Other course curriculum has been developed over hundreds of years," Forrester said. "When a teacher is determined to be deficient in their particular field, we can rightly require remediation. Computer education has struck us in recent years as being a very important topic for instruction. The teacher who is not fully literate in computer education can not be deemed deficient in their area of instruction.

"However, if we're responsible for their instruction, it becomes mandatory they become proficient with computers. Now our job becomes one of attempting to train over night literally thousands of teachers—a task that is virtually impossible."

The school system has held perhaps 150 computer workshops for educators, Forrester said.

"Those are the courses that need to be looked at and evaluated, to see if we're doing what is expected of us," he said.

At least the workshops have exposed educators to the new technology, and have increased their enthusiasm to learn more, Forrester said.

"But we're not able to reach everyone to make them enthusiastic," he added.

Most of the colleges and universities in Dade offer computer training courses for teachers. The school system can't dicitate the course content but works closely with the schools, Forrester said.

Neither does the system require that teachers take such courses, he said. When resources are limited, attentin must be given to those tachers and principals who are already motivated, Forrester said. As more become convinced of the importance of computer education, more will be motivated to seek out training, he said.

Some of the problems teachers and principals have experienced stem from the school board's haste in acquiring large numbers of computers two years ago, Forrester said.

At that time, the focus was on acquisition. The school board appointed a steering committee to review proposals from various computer equipment firms. The committee voted to award a contract to Atari, despite learning that the company lacked the variety of educational software available from other companies.

Miami Beach High teacher Milton Zoloth, who served on the committee, said he was opposed to giving the contract to Atari because of its software shortage. Zoloth said he went along with the committee majority when Atari representatives promised that cartridges to teach programing would be developed. Two years later, they still are not available, Zoloth said.

Forrester, also a member of the committee, said the goal then was to get as much equipment for the money as possible. Suitable software programs were only a secondary coinsideration, he said, as was training.

This time under Forrester's direction, the school board is taking a different approach. Available software was evaluated for one week by teachers and principals, and the decision next month to spend $5.5 million will be based on buying the equipment that is compatible with the best instructional programs, he said.

And this time around, Forrester said, vendors will be required to provide training for teachers—something that was not required before.

KIDS CAN HEAR AND SEE MUSIC WITH COMPUTER

Music teacher Jerome Siegel lugs his own microcomputer off to Blue Lakes Elementary each morning and back home with him each afternoon.

"With the computer," Siegel said, "the children are using many more senses. They see the music and hear it and watch it change colors as the notes change."

Most importantly, he says, the computer makes it that much easier to capture and hold a class's attention.

"If the kids are interested," he said, "that's half the battle."

Siegel usually gets to school an hour before first period, and is joined in the music room by a dozen or so children who come in to play games on the computer.

"I have musical instruments scattered around the room." he said. "When they're not using the computer they pick an instrument, and wind up getting extra musical training before school."

"I'm here for the kids to learn," he said. "I prefer to use my own equipment. I'm an electronics freak. This is my hobby. For me it's a great feeling to type away on this little piece of nuts and bolts and make beautiful music."

Siegel writes his own computer programs because of a lack of commerical tapes and discs suitable for his young charges.

"Once I start writing a program, I know the evening is shot," he said. "I'll be at it until 2 in the morning."

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June 8, 1983

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The Honorable Bob Packwood
Chairman, Subcommittee on Taxation
and Debt Management
Committee on Finance
SD-221 Dirksen Senate Office Building
United States Senate
Washington, D.C. 20510

Re: Statement on S. 738 and S. 654
(P.R. # 83-189)

Dear Chairman Packwood:

Tax Executives Institute, Inc. submits this statement for inclusion in the record of the Subcommittee's May 27, 1983, hearing on certain miscellaneous tax bills, including S. 738 and S. 654. (S. 654 was originally scheduled to be considered during the May 27 hearing, but has since been rescheduled for consideration at a hearing on June 17; we request that the relevant part of this statement be associated with the record of that hearing.) S. 738 would make permanent the credit for increasing research activities (section 44F of the Internal Revenue Code of 1954, as amended), and S. 654 would provide that for purposes of section 861(b) and section 862(b) of the Code all amounts allowable as a deduction for research and experimental expenditures (within the meaning of section 174 of the Code) attributable to activities conducted within the United States are to be allocated to sources within the United States. Tax Executives Institute heartily endorses both bills and urges their prompt and favorable consideration by the Subcommittee.

Background

Tax Executives Institute (TEI) is a voluntary, nonprofit association of corporate and other business executives, managers, and administrators who are responsible for the tax affairs of their employers.

TEI currently has more than 3,800 members who represent approximately 1,100 of the leading corporations in the United States and Canada.

No single industry dominates TEI. We represent a cross-section of the business community and believe our diversity and dedication to the tax function qualify us to address issues concerning the administration of the tax laws and the effective implementation of tax policy. As the principal association of tax executives, TEI is dedicated to promoting the uniform and equitable enforcement of the tax laws throughout the nation and to reducing the costs and burdens of administration and compliance to the benefit of government and taxpayers alike.

S. 738

S. 738, sponsored by Senators Danforth, Bentsen, Chafee, Glenn, Grassley, Symms, Boren, Tsongas, Durenberger, Wilson, and Cohen, would make permanent section 44F of the Internal Revenue Code. Section 44F, which provides a credit for increasing research activities, was added to the Code by the Economic Recovery Tax Act of 1981 and applies with respect to amounts paid or incurred for "qualified research" (within the meaning of section 44F(b)) between July 1, 1981, and December 31, 1985. S. 738 would remove section 44F's sunset provision. TEI supports its passage.

A principal purpose of the Economic Recovery Tax Act of 1981, of course, was the stimulation of growth in the economy by providing incentives for capital formation. The legislative history of the 1981 Act clearly reflects Congress's view that increased investment in research and development is a key to increasing productivity. Section 44F is an integral part of the business incentives that Congress enacted to spur that increased investment and was intended to "overcome the resistance of many businesses to bear the significant costs of staffing which must be incurred in initiating or expanding research programs." S. Rep. 97-144, 97th Cong., 1st Sess. 76-77 (1981); accord H.R. Rep. No. 97-201, 97th Cong., 1st Sess. 111 (1981). See also Staff of the Joint Comm. on Taxation, General Explanation of the Economic Recovery Tax Act of 1981, at 120 (1981). As Assistant Treasury Secretary Chapoton stated at the May 27 hearing, enactment of section 44F manifested Congress's decision that broad government support for research and experimentation -- in the form of subsidies for R & E investment -- is warranted and highly desirable.

The credit, however, is scheduled to expire at the end of 1985, and it has been suggested that the question posed by S. 738 is, "does the research tax credit work?" Has section 44F proven effective in increasing research and experimentation activities in the United States? The Subcommittee has heard testimony from several private sector witnesses that, to the extent the credit's short-term effect can be gauged, section 44F has indeed spurred research and development. The Treasury Department's own analysis would seem to confirm this.

Even if this were not the case, however, TEI submits that S. 738 should be favorably considered. This is because, in a very real sense, there is a wholly different question that the Subcommittee should consider. That question is, "has the research tax credit been given a chance to work?" Tax Executives Institute respectfully submits that, with respect to many taxpayers and a large number of research projects, the answer to that question is, unfortunately, no. We reach this conclusion for two reasons.

First, the planning cycle for research and development is typically long-term. Thus, decisions made today may not produce tangible results, or even necessitate significant expenditures of funds, for several years. In other words, planning decisions made following the enactment of section 44F are in many cases just now beginning to have operational effect. To suggest that the credit has not worked or will not work because its effect has not been immediate is to misapprehend the nature of research and development.

Secondly, and perhaps more important, continuing uncertainty over what the credit applies to and whether it will be available after 1985 has very possibly had both a short-term and a long-term stifling effect on research and development. In the short-term, the absence of implementing regulations (the Internal Revenue Service did not even issue proposed regulations until January of this year, and the promulgation of final regulations is still months away) could well have lead taxpayers (especially those at the margin) to delay or even cancel research projects that they might otherwise have undertaken. In the long-term, the uncertainty over whether the credit will be available after 1985 almost without question diminished the incentive effect of section 44F. This is especially the case since, as already noted, planning decisions made today will involve the expenditure of funds in the "out years" when the credit will not (save S. 738) be available. For this reason, the simple extension of section 44F (as the Treasury Department has suggested as an alternative to S. 738) could not possibly have the long-term salutary effect that making the credit permanent would have.

In summary, Tax Executives Institute believes the removal of section 44F's sunset provision, coupled with either the regulatory or legislative clarification of the credit's reach, is essential if section 44F is to accomplish its intended and certainly laudable purpose. We recommend that the Subcommittee act favorably on S. 738.

S. 654

S. 654, sponsored by Senators Wallop, Armstrong, Symms, Boren, Durenberger, Danforth, Roth, Glenn, Heinz, Packwood, Chafee, and Baucus, would amend the Code to provide that, for purposes of sections 861(b) and 862(b), all amounts allocable as a deduction for research and experimental expenditures (within the meaning of section 174) attributable to activities conducted within the United States are to be allocated to sources within the United States. The bill would thus render invalid section 1.861-8 of the Treasury Department's income tax regulations, which contains rules for allocating and apportioning such amounts between U.S.-source and foreign-source income, thereby making permanent a moratorium on the application of Treas. Reg. § 1.861-8 which Congress passed as part of the Economic Recovery Tax Act of 1981. Unless Congress acts, the moratorium will expire (for calendar year taxpayers) at the end of 1983. TEI supports prompt enactment of S. 654.

Under Treas. Reg. § 1.861-8 (before enactment of the congressional moratorium), when a taxpayer performed research activities in the United States, a portion of the tax deduction for expenses attributable to that research was allocated to the taxpayer's foreign-source income. In certain cases this allocation had the effect of denying the taxpayer a foreign tax credit on that income, thereby effectively depriving the taxpayer of the benefit of that portion of the deduction in the United States.

The allocation rules currently contained in Treas. Reg. 1.861-8 without question present a clear disincentive to the performance of research and experimental activities in the United States as opposed to European and other countries. Thus, the effect of allowing the moratorium on applying Treas. Reg. 1.861-8 to expire would be to undermine the policy underlying Congress's decision in enacting section 44F to favor research conducted within the United States. Consequently, Tax Executives Institute urges the Subcommittee to act favorably on S. 654.

Conclusion

Tax Executives Institute commends the Subcommittee for holding a hearing on these important bills and appreciates the opportunity to present our views. If we can be of any assistance to the Subcommittee, technical or otherwise, please do not hesitate to let us know.

Respectfully submitted,

TAX EXECUTIVES INSTITUTE, INC.

By: Sol Coffino
Sol Coffino
President

STATEMENT OF
TIMEX COMPUTER CORPORATION
BEFORE THE
SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT
OF THE SENATE FINANCE COMMITTEE

S.1194: Technology Education Assistance and Development Act of 1983

S.1195: High Technology Research and Education Development Act of 1983

May 27, 1983 Hearings

Timex Computer Corporation submits this statement in opposition to the portions of the "Apple Computer Bills", S.1194 and S.1195, which provide increased tax deductions for contributions of computers to primary and secondary schools.

We enthusiastically endorse the purpose of the Bills, to promote computer literacy among primary and secondary school students. A fundamental and far-reaching technological revolution is now under way. If our country is to compete with other technologically advanced countries like Japan in this new electronic world, our school children must be computer literate and have meaningful access to computers.

Our traditional educational system is adapting to meet this challenge. Some colleges now require every student to own a computer for use with all course work, while others require computer literacy as a prerequisite to graduation. Within the next ten years computer literacy will be a prerequisite for admission to many colleges. Affluent school districts have begun purchasing computers for their primary and secondary schools. A joint commitment from schools, business, and the government is required to insure all our school children have access to computers.

The issue is not whether computer literacy is a worthwhile goal. All sides agree decisive action is required. The real issue is what the program should be.

We believe tax expenditure legislation like the Apple Computer Bills is an expensive and inefficient way to promote computer literacy. It may satisfy a few computer manufacturers, but it will not satisfy educators or the public interest for the following reasons:

From the educator's standpoint:

1. Loss of control. Under this tax expenditure legislation the computer manufacturer will decide which of its products to "give" and which schools to give to. Teachers and school administrators will have no control over the type and number of computers that will be placed in their schools, even though the program is at public expense. Teachers will not be able to develop a coherent, logical plan to acquire computer equipment that meets their students' special needs. Instead they will be forced to take what manufacturers offer them "or leave it". The most probable result will be a crazy quilt of donated computers, peripheral equipment and software in each school that cannot be used interchangeably with computer equipment already in place or with equipment donated by other manufacturers, and disjointed

computer education programs that do not build from one year to the next. Schools will be forced to spend large sums on fill-in purchases of peripherals, software and later generation computers to rationalize the computer equipment they are "given".

2. Program too narrow. The Bills require computers be donated pursuant to a written plan which provides for donations across geographic and economic lines. It is hoped these written plans will insure fairness. They will not. Some school districts will receive no computer equipment at all or so little (one computer per school) as to be meaningless. Every child should have significant access to a computer. These Bills will not achieve that result.

3. Bills discriminate against worthwhile computer products. As written, these Bills contain technical limitations that discriminate in favor of expensive "high end" computers and actually exclude less expensive computers, even though these less expensive computers have unquestioned educational value and may be more suitable to teach computer literacy. We believe these Bills would not cover 80-90% of the personal computers sold in 1982. The limitations that exclude many worthwhile computers are discussed at greater length below.

From the standpoint of public interest.

1. Cost. The cost of this legislation is open-ended and cannot be controlled.

2. Neutrality. Tax legislation is a an inefficient and unpredictable way to promote social policy goals, no matter how worthy. The Internal Revenue Code is already too complicated. Every addition to the Code makes tax simplification less likely.

These bills are not even satisfactory
from the computer manufacturer's standpoint:

1. Enforcement will be unsatisfactory. Enforcement of these tax expenditure measures, through the IRS audit process, will be particularly unsatisfactory. These Bills will leave it to the IRS agent to determine whether a particular computer is "suitable for educational use," whether it has sufficient memory capacity, computer language capability, etc. and whether the manufacturer's written plan for donations is fair. This asks too much of the tax audit process. How can IRS agents be expected to make these determinations when some of the Bill's proponents are unsure about some technical aspects? A taxpayer will not be able to determine whether its donations will be allowed on audit.

2. Bills favor established manufacturers. Not all computer manufacturers can take advantage of tax expenditure legislation. Established computer manufacturers and manufacturing divisions which are part of large conglomerate corporations are sure to have taxable income, including income from other products and activities, which increased tax deductions will offset. Newer entrants, which normally experience losses in their early years, can't use additional tax deductions. These new companies will be

foreclosed from the educational market, perhaps permanently, because schools will become tied to the products given them by more established manufacturers. It is surprising the Congress would consider fostering anti-competitiveness in the electronics industry through tax legislation.

The Bills cannot be amended to cure these problems - they are inherent in all tax expenditure legislation. We therefore oppose the Bills in principle.

SPECIFIC LIMITATIONS IN THE BILLS

In addition to the general problems above, we believe the Bills have specific problems. Correcting these specific problems will not correct the general problems discussed above. Even if all the specific problems were cured, the general problems remain so serious we would continue to oppose the Bills.

The Bills define "qualified computer equipment" too narrowly, excluding less expensive computers with unquestioned educational value. These limitations were intended to insure the tax expenditures in the Bills go to purchase "the best possible computers" and not electronic game machines.

We agree that public funds should not be used to purchase game machines, but these limitations will not work.

For one thing, the Bills confuse price/computing capability with educational value. Teaching computer literacy can be done much more effectively with 20 $100 computers which are somewhat less powerful than with one $2,000 computer that is more powerful but only occasionally available for a student's individual use. Students must have meaningful, regular access to a computer. When we teach children to write, we don't buy one electric typewriter for the entire class and require the children to stand in line to use it; we provide each student with his own pencil. The same teaching principle must apply for computer literacy. Requiring a high price and a lot of computing capability may exclude game machines, but it will also exclude the very computers that should be covered.*

For another thing, these definitions will prove too restrictive over time. Any definition of "qualified computer equipment" would be too narrow because no one can say what new computer products will be introduced in the next few years.

Particular technical problems with the Bills are as follows:

1. Suitable for educational use. A qualified data processor must be "suitable for educational use". (S.1194, proposed new Section 174A (c)(1)(B)(I)).

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*This points up the problem of putting control of the program in the hands of manufacturers, a problem which is inherent in this type of tax expenditure legislation. If educators rather than manufacturers could control what computers the public's money will buy, there would be no danger that game machines would be purchased with federal funds.

This limitation is too vague. Any electronic data processing machine that can accept programs can be used for educational applications. Even programmable electronic game machines can accept educational software, such as basic arithmetic, state capitols, etc. Therefore this limitation adds nothing and should be eliminated.

2. Three languages. A qualified data processor must "support at least three computer languages". (S.1194, proposed new Section 174A (c)(1)(B)(i)(II)).

The language requirement also should be eliminated. Even if a computer's micro-chips are only programmed in one computer language, software can be written so the user can program the computer in different computer languages. The software in effect translates from one computer language to the other. Thus, so long as the computer can accept programs it can support other computer languages. Therefore, there is no need to specify a number of languages.

3. Capacity. A qualified data processor must have "a random access memory with a capacity for at least 16K bytes, expandable to at least 48K bytes". (S.1194, proposed new Section 174A (c)(1)(B)(i)(III)).

A computer with memory expansion to 16K bytes can perform numerous demanding educational tasks. Requiring more memory is simply discriminatory in favor of Apple and other high end computers, and does not contribute to the educational purposes of the Bill.

Furthermore, there is no need to distinguish between on-board memory and capability to accept memory expansion devices. If there is to be any memory requirement, the Bill should simply state this memory must either be built-in, supplied by an expansion device which is also donated, or supplied by other computer equipment which the recipient already owns.

Any memory requirement at all is probably counterproductive. For example, a long-term trend may be for each student to have a portable computer terminal that can "plug in" to large data bases at school and at home. These terminals may have no built-in memory capability, since the central processing unit would have all the memory capability required. Under the Bills these remote terminals would not be included in the definitions of "data processors" or "ancillary computer equipment". As another example, some applications may require modest memory or computing ability if the computer is connected to a bulk storage device (disc drive, etc.) which can be searched for relevant information.

4. VDU. A qualified data processor must be "accompanied by a screen for visual display of data". (S.1194, proposed new Section 174A (c)(1)(B)(i)(IV)).

Some computers use an ordinary television set for a visual display rather than a built-in screen. Some schools may already have television sets that could be used with donated computers, or they may be able to purchase television sets cheaply. Manufacturers should not be required to supply displays if they are not a built-in part of the product.

5. Ancillary computer equipment. Ancillary computer equipment shall mean "a display screen, a printer, a disc drive" (S.1194, proposed new Section 174A (c)(1)(B)(ii)).

This definition excludes valuable peripheral equipment such as telephonic communication interface devices (modems), data storage and retrieval devices that are not disc drives ("stringy floppies"), terminals that do not satisfy the definition of a "qualified data processor", etc. A definition of ancillary computer equipment by examples will be obsolete even before a Bill is enacted, because the computer industry is changing so fast.

6. Assembled by the taxpayer. "Such transfer is of property which is assembled by the taxpayer, and the taxpayer is regularly engaged in the business of assembling, and selling or leasing computer equipment of the same kind as such property". (S.1194, proposed new Section 174A (c)(1)(D)).

Many computer companies do not assemble their own products, but purchase product assembled by affiliated companies. Assembly by corporations under common control with the taxpayer, as such affiliation is covered by Internal Revenue Code section 482, should be sufficient under the Bill. Furthermore, since many computers are designed for use with television sets which the computer manufacturer does not assemble, assembly of the visual display unit should not be required if video displays must be included in the definition of "qualified computer equipment".

7. Minimum value. S.1195 provides the value of the qualified computer equipment property must exceed $250 (S.1195, proposed new Section 174A (c)(1)(K)).

There should be no minimum dollar value limitation. This limitation would disqualify the great majority of personal computers sold (including those already used in schools) despite their educational value.

There is a parallel with portable calculators: portable electronic calculators cost several hundred dollars when first introduced, but the price fell to $10-$50 in just a few years. These new calculators are more powerful, more compact and easier to use than their more expensive predecessors. If the same type of legislation had been enacted for calculators 20 years ago, these new calculators would have been excluded and the older, more bulky, less powerful ones covered. The same is happening today in personal computers. Any dollar minimum will be obsolete before a bill is enacted.

If the purpose of this dollar value limitation is to reduce revenue loss (and not simply to favor Apple Computer and other high-end computer companies), there are better ways to do it. Deductions could be limited to $100 per computer, for example, or $1 million per taxpayer.

8. Limitations - units sold. Contributions are limited to amounts "not in excess of 20% of the number of units of the product, on a product-by-product basis, sold by the taxpayer in the ordinary course of its business in the taxable year". (S.1194, proposed new Section 174A (e)(2); S.1195, proposed new Section 174A (f)(2)).

This is intended to prevent a manufacturer from dumping slow-selling computer products on educational institutions. There is no necessary correlation between sales volume and suitability for educational use, and slow-selling computers may nonetheless be well adapted for school use, especially computer literacy. Moreover, this type of limitation will favor established manufacturers with large sales volumes and discourage entry into the educational market for new computer manufacturers whose sales volume is small but growing.

9. Effective date. The Bills are effective for taxable years beginning after the date the Bills are enacted.

Corporations with fiscal years beginning in the second half of the year could begin to take immediate advantage of the Bill if enacted soon, whereas corporations on a calendar year could only begin making contributions under the Bill in January, 1984. Once again, this limitation seems to favor Apple Computer, whose fiscal year begins in September.

CONCLUSIONS.

Tax expenditure legislation like the Apple Bills will not get the right computers into primary and secondary schools. There will certainly be a loss of revenue in a time of great budget problems, but no certainty of benefit. A few high-end computer manufacturers may benefit, but the public may not. We will be happy to work with the Subcommittee to improve technical aspects of a bill to insure that it covers all pertinent computer equipment and computer manufacturers, but we doubt that any tax expenditure legislation can do the job, even if the technical problems are solved.

An indication these Bills will not accomplish their stated objective is the reaction to them. The tax-paying public views the Bills as special interest legislation to benefit a few manufacturers; education groups have endorsed them but essentially as "better than nothing"; most computer manufacturers have been silent except the few who are sure to benefit; the Treasury has opposed them.

If, however, the Congress believes it would be in the national interest to promote computer literacy by public funds, we believe that a grant bill would be preferable in every respect to any tax expenditure bill, however it is revised to remove the defects stated above. With a grant bill, local school teachers and administrators could develop programs that suit their local needs, and purchase exactly those computers, peripherals and software that fit their programs. All manufacturers could freely compete for this market on an equal footing. The public's interest could be served because the cost of the program could be known at the beginning and reduced or increased over time as desired.

The only arguments we have heard against a grant bill are that it will cost money, that the schools will not get as much computer equipment for their dollar as under the present bills, and bureaucracy will be increased.

These tax expenditure Bills involve a cost to the public just as surely as a grant bill. We are convinced a grant bill could be drafted that would provide better computer equipment for schools at no greater cost than S.1194 or S.1195, with no increase in federal or state bureaucracy, and with broader and more certain educational benefit. We would be pleased to assist Congress in preparing such legislation.

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May 25, 1983

Roderick A. De Arment
Chief Counsel, Committee on Finance
Room SD-221, Dirksen Senate Office Bldg.
Washington, D.C. 20510

Dear Mr. De Arment:

My name is George W. O'Dair and I am Executive Vice President, Finance and Administration for Varian Associates, Inc. headquartered in Palo Alto, California. Varian is a diversified multi-national manufacturer of high-technology products used in the electronics, communications, defense, medical, scientific and analytical instrument, industrial components and semiconductor equipment industries. In 1982, Varian had total sales of $691 million of which approximately 22% were from products sold outside the United States. My purpose in writing is to offer some comments about the U.S. tax treatment of R&D expenses, especially the allocation of such expenses against foreign source income (S. 654). My colleague, Dr. E.J. Barlow, Vice President, Research & Development, will address the R&D tax credit (S. 738) in a separate letter.

Varian prides itself in offering customers the most advanced technology in the products it sells. To accomplish this, we must constantly spend considerable amounts on R&D to improve and upgrade existing products, as well as to develop new products which will meet the ever-changing needs of customers in a high-technology environment. Varian faces significant competition from both domestic and international manufacturers in most areas of its business.

During fiscal 1980 through 1982 Varian expended the following amounts for R&D.

COMPANY-SPONSORED R&D SPENDING
FISCAL YEAR

	1980	1981	1982
Domestic	$31.1M	$35.9M	$38.9M
Foreign	2.9	2.7	2.4
Total	$34.0M	$38.6M	$41.3M
% of Domestic To Total	91.5%	93.0%	94.2%

Estimates indicate Varian's R&D spending will increase by approximately 25% during fiscal 1983 over 1982 levels. Approximately 96% of FY 1983 R&D expenditures will be spent in the U.S.

It is significant to note that Varian's increased R&D expenditures come at a time of worldwide recession. One reason is the lower after-tax cost of U.S. R&D spending due to the enactment of special R&D tax benefits in 1981. It is equally important to note that Varian's domestic R&D expenditures have increased while foreign R&D expenditures have decreased. Although many foreign countries have established extremely favorable tax and business incentives for R&D, we nevertheless have found it economically justifiable to retain and even increase domestic R&D spending primarily because of the recent tax incentives. Thus, while other factors will influence our decision on where to conduct future R&D projects, tax incentives will play a significant role in such decisions.

In addition to the cost-savings of such programs, a strong national R&D program provides marketing benefits to U.S. companies by permitting them to offer superior products. This is an invaluable asset in overcoming the barriers currently emerging in international trade.

In summary, we believe the R&D tax credit and the moratorium on allocating domestic R&D expenditures against foreign source income are important economic incentives and should both be incorporated into a permanent tax incentive program for U.S. growth industries. Thus, we encourage the Finance Committee and other members of Congress to strongly support Senate Bills 654 and 738.

Very truly yours,

VARIAN ASSOCIATES, INC.

George W. O'Dair
Executive Vice President
Finance & Administration

JAT:GWO:m

Federal National Mortgage Association FNMA

3900 Wisconsin Avenue, NW, Washington, DC 20016
202 537 6180

June 17, 1983

The Honorable Bob Packwood
Chairman
Subcommittee on Taxation
and Debt Management
Committee on Finance
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

The Federal National Mortgage Association (FNMA) supports S. 1147, the "Mortgage Debt Forgiveness Tax Act of 1983," and encourages the Congress to pass this bill into law during 1983. This letter sets forth the reasons for our support. We respectfully request that you include this letter in the record of the hearings on S. 1147 held by your Subcommittee on May 27, 1983.

Senators Danforth and Tsongas, the sponsors of S. 1147, are to be commended for introducing this important and highly desirable proposed amendment to the Internal Revenue Code of 1954. They should also be commended for their concern for taxpayers who prepay their home mortgage loans at a discount only to find out later, to their surprise and financial detriment, that the discount amounts to an incidence of receipt of "ordinary income" taxable in the year of receipt. While no statistics are available as to the number of taxpayers who have unintentionally made themselves subject to such taxation, we suspect that the number is significant.

Present law acts as a deterrent to the prepayment of a home mortgage loan by a mortgagor (borrower) because the benefit of the discount is outweighed by the consequence of the taxes incurred. S. 1147 would correct this situation by providing an additional exception to the general rule of Section 61(a)(12) of the Internal Revenue Code of 1954 that the gross income of a taxpayer includes income from the discharge of indebtedness. S. 1147 would give home mortgage indebtedness treatment similar to "qualified business indebtedness," defined under the Code as indebtedness incurred or assumed by a corporation or by an individual in connection with property used in his or her trade or business. We believe that the public policy reasons for providing special tax treatment to qualified business indebtedness are no greater than those for providing the same special tax treatment to individuals who own and live in homes encumbered by mortgage debt.

We would emphasize that S. 1147 would not result in a revenue loss to the U.S. Government, but a shift in the receipt of such revenue. The bill does not relieve the homeowner of tax liability on income. It simply defers recognition of the income until such time as the taxpayer sells the property. As Senator Danforth has pointed out, this proposal is similar to other provisions in the Code which allow income recognition to be deferred until the taxpayer actually has the funds with which to pay the tax.

The benefit accruing to homeowners from S. 1147 is obvious. The benefits to others are less obvious but equally important. Some of these are:

- Housing production and home mortgage financing would be aided by the infusion of money from home mortgage prepayments because the increase in the supply of mortgage funds should help reduce mortgage interest rates.

- With greater levels of housing production and sales of existing homes, additional jobs would be added to the economy and additional income would be generated for individuals and businesses. The net result would be an increase in revenues to the Federal Government.

- Portfolio lenders such as thrift institutions and FNMA would be able to ameliorate their financial conditions. The elimination of low-yielding, fixed-rate long-term mortgages from their portfolios would increase the average yield on portfolio. One of the important measures of financial health of a portfolio lender is the degree to which the yield on portfolio exceeds the cost of borrowing.

Relevant to this last point, FNMA is often characterized as a huge savings and loan association. Like savings and loan associations, FNMA has been a major provider of funds for housing. Since 1969, FNMA has purchased 6.8 percent of all one-to-four family mortgage loans originated. Its support of housing has been even greater during the recession years of 1970, 1974, 1980 and 1981-82. In those times of high interest rates and reduced mortgage credit availability, FNMA has supplied nearly one out of every ten mortgage dollars borrowed in America.

However, FNMA's ability to provide this needed support to homebuyers has been seriously jeopardized by its extreme sensitivity to interest rate changes caused by the maturity mismatch of the mortgages owned and the money borrowed to purchase the mortgages. FNMA's mismatch of very long-term mortgage assets funded with short- and intermediate-term liabilities produced unprecedentedly large losses during the high interest rate period of 1981-1982. To avoid repeating this experience, the corporation is attaching the highest priority to reducing its sensitivity to interest rates.

FNMA's primary strategy for dealing with this mismatch has been to initiate a "self help" program to emphasize fee income -- including the guarantee fees on its mortgage-backed security -- and to aggressively build a portfolio of "matched" adjustable rate mortgages. The rationale behind this strategy is that the volatile nature of FNMA's "mismatched" portfolio earnings can be partly offset by a significant flow of earnings that is not rate sensitive. This steady flow of "matched" earnings and fees will lower the perceived riskiness of the company, allowing it to borrow less expensively in the credit markets, post more competitive rates to home loan sellers, and expand its commitment to the housing market.

The process of matching assets to liabilities takes much time, however. One of the important methods to be used to speed the process along is to encourage the payoff of low-yielding fixed-rate mortgages having 10 to 20 years remaining until the time of final payments. Offering discounts for prepayment does in fact encourage mortgagors to pay off their mortgage loans, as does accelerating the payment of the mortgage principal.

Although S. 1147 would defer the discount gain from prepayment to a later date, it has the compensating effect of encouraging the elimination of interest payment deductions which serve to reduce the amount of taxes paid each year by mortgagors.

The following combination of factors speak well for the merits of S. 1147: elimination of possible financial hardship to taxpayers surprised by an extraordinarily large tax bill for the receipt of income; gain to the U. S. Treasury; and, assistance to troubled and important housing finance institutions.

Mr. Chairman, we hope you and the committee agree with us that, on the merits, S. 1147 is highly desirable legislation. We encourage the committee to report the bill to the Senate for floor action at the earliest opportunity.

Very truly yours,

Linda P. Gallagher

LPG/mdk